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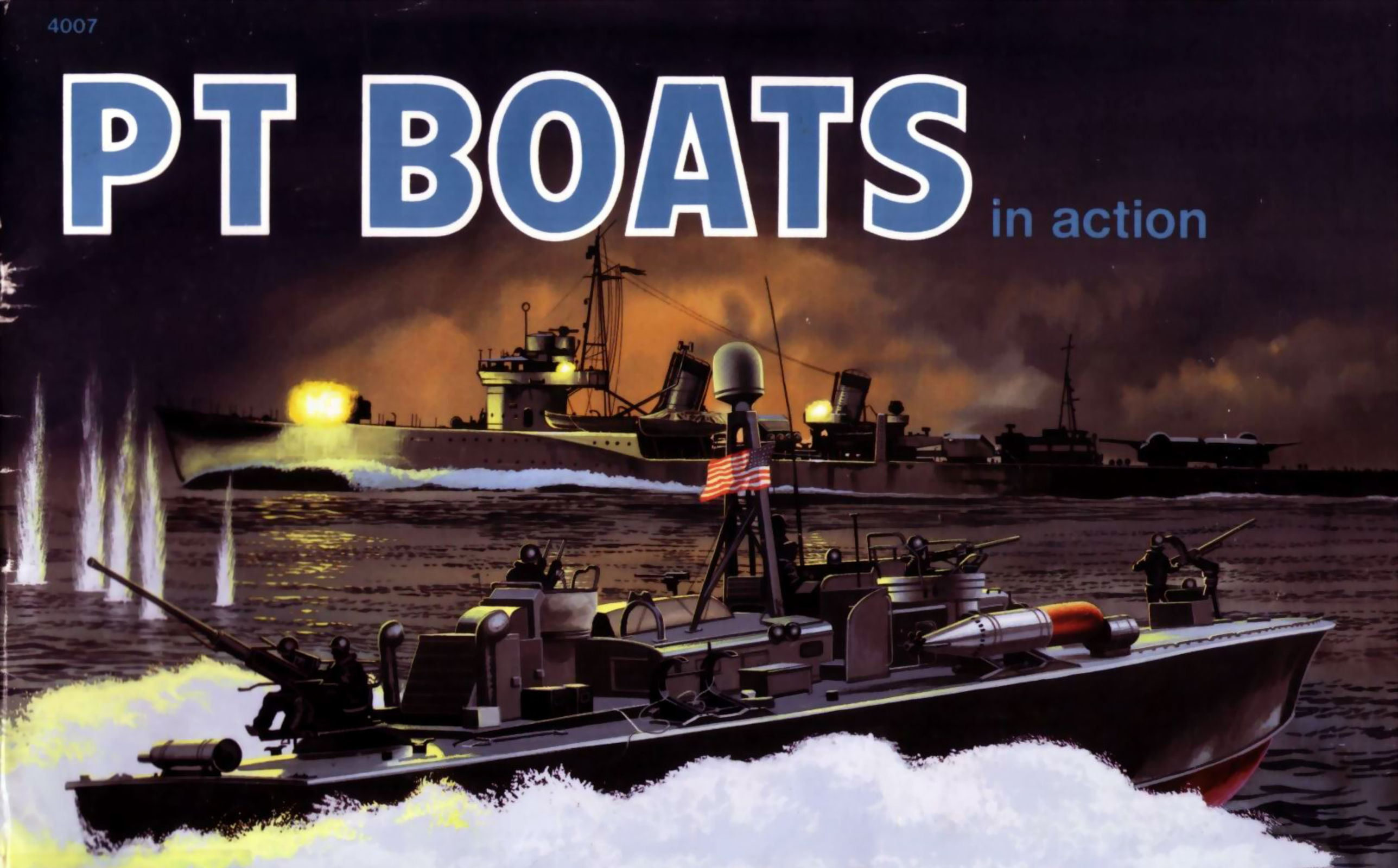
PT BOATS in action



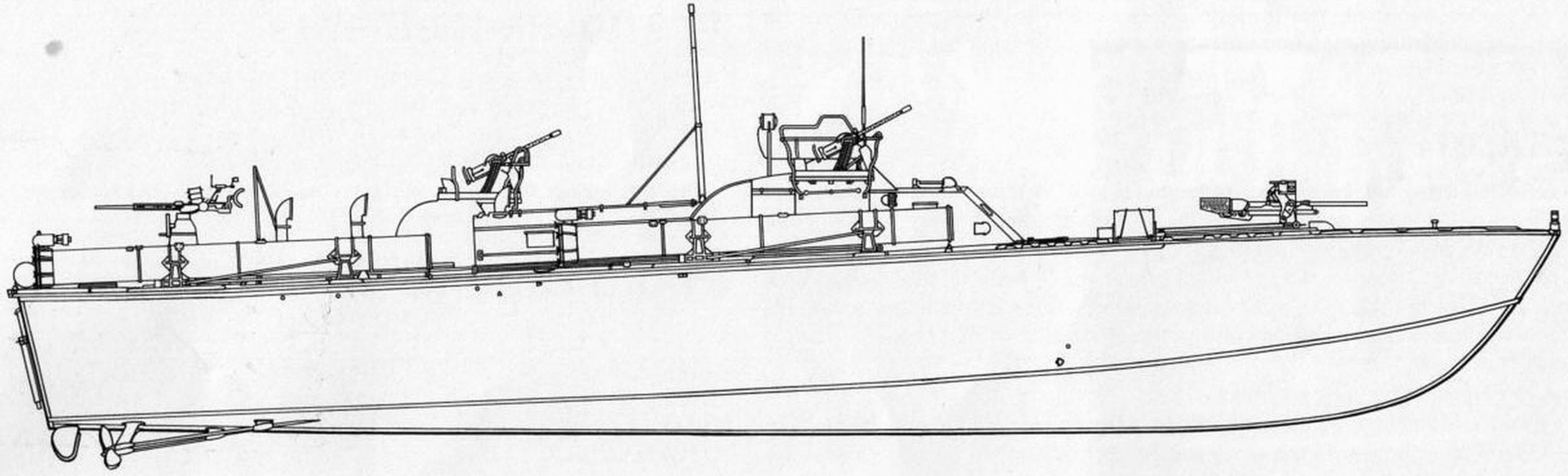
DON GREER

Ship Number 7

squadron/signal publications

PT BOATS in action

By T. Garth Connelly
Color by Don Greer &
Tom Tullis
Illustrated by Joe Sewell



Warships Number 7
squadron/signal publications

PT-137, under the command of LT I.M. Kovar, fired a torpedo at a Japanese destroyer on the night of 24/25 October 1944. The torpedo passed under the destroyer and hit the cruiser ABUKUMA, killing thirty men and damaging the ship. She fell out of line and was later sunk by U.S. aircraft.

Dedication

This book is dedicated to my family, who has supported me for 34 years, who has put up with my watching "PT-109" for hours on end, for putting up with my buying every PT boat book in existence and for lugging me all over two preserved PT boats.

It is also dedicated to the loving memory of Miss Donna Lynn "Moxie" Licsak. A very special friend who called me her "Don Quixote" because she watched me go tilting at windmills that people far wiser than I considered unworthy of their efforts. Well, "Moxie"... here's another windmill, my friend."

I also want to dedicate this book to James "Boats" Newberry, the late founder of PT BOATERS, a generous "Southern Gentleman" who let a fifteen year old kid into the ranks of unsung heroes. To Beth Haluszka, a boss who gave me my head, and to Charlene Swanson - a real, special and dear friend and to Janice Mulhern.

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I would like to acknowledge the assistance that I received from Al Ross of Coastal Forces, Inc. and Alyce Mary Guthrie, daughter of "Boats" Newberry and Executive Vice president of PT BOATERS, and Patty Maddocks of the United States Naval Institute, in gathering the information and the photographs used in this book. I would also like to thank Cindy Dvorachek for her help in doing the layout of this book and Janice Mulhern for retyping the manuscript.

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D. Jones

PT-68 was a late production Elco seventy-seven foot PT Boat stationed in the Southwest Pacific during the Second World War. Besides her standard armament, she has a .50 caliber machine gun mounted on a standard infantry tripod on the bow for extra firepower. (Naval Institute)

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Introduction

This history of the development of the American wartime PT (Patrol Torpedo) boats began life as a book proposal on just one class of these fast wooden boats, which I submitted to Mr. Nick Waters of squadron/signal publications. He suggested that I turn the proposed manuscript into a developmental history of all U.S. wartime PT boats.

American PT boats served in every theater of operations, from 7 December 1941 to August of 1945. They served in the United States Navy, the British Royal Navy and the Russian Navy. One was even captured by the German Kriegsmarine and used operationally for a short period.

It is claimed that a PT boat (PT-23) shot down the first Japanese aircraft of the war. It was a PT boat (PT-41) that took GEN Douglas MacArthur out of Corregidor and it was a PT boat (PT-373) that took him back to the Philippines in 1944.

The book will cover the development of each of the classes that saw combat in the Second World War, and how they evolved from a Scott-Paine design brought back from England by the Chairman of Elco during 1939. At the start of the war, these boats were operating in the role that they were designed for, fast torpedo attacks at night. By the mid-point of the war, they were being transformed into gunboats for attacks on enemy landing barges. The end of the war saw some of the newer boats coming from the factories sporting crude five inch rocket launchers, which gave these little boats the punch of a Destroyer.

In the late 1930s the United States Navy had a few experimental PT boats in service. These boats ranged from fifty-four to eighty-one feet long, but none of them had very satisfactory performance. During 1938, Congress appropriated fifteen million dollars as a supplement to

PT-3 was a fifty-eight foot torpedo boat built by the Fisher Boat Works of Detroit, Michigan that proved to be unsatisfactory. The torpedo tubes launched the torpedoes sternward, so that the boat would be moving away from the target at the time of launch. (Naval Institute)

the 1938 Fiscal Year Naval Program. This fifteen million was for the construction of experimental vessels with a standard displacement not to exceed three thousand tons.

Specifications were set for fifty-four and seventy foot Motor Torpedo Boat designs. The fifty-four foot boat was to have a maximum top speed of forty knots with armament specified at two torpedoes, with an alternative arrangement of machine guns and depth charges. The last specification set forth for both designs was the boats could not weigh more than twenty tons. This limit was to allow quick transportation by boom-equipped cargo ships.

Armament for the seventy foot design was to be more substantial than that of the fifty-four foot boat. It was to be armed with at least two twenty-one inch torpedoes in addition to depth charges and anti-aircraft guns. This boat would have a top speed of forty knots and a cruising range of five hundred fifty miles.

30 September 1938 was the deadline for designers to submit their proposals to the Navy. The Navy received a total of thirty-seven design proposals. Of these, the Navy chose three of the designs in the fifty-four foot category and five seventy foot designs for further consideration.

These eight designers were now asked for more detailed plans of their boats. Their submissions had to be turned into the Navy no later than 7 November 1938. After the Navy had studied these plans, the Navy announced on 21 March 1939, that Professor George Crouch had won in the fifty-four foot design category.

The winning proposal in the seventy foot design category was the renowned naval architectural firm of Sparkman and Stephens. Two months after these announcement were made, the Navy announced that three boat yards were awarded contracts to build six experimental boats based on the two winning designs, which by this time, the Navy was calling Patrol Torpedo (PT) Boats. With the issuing of these contracts, the American PT Boat was born. The first boats were given the hull numbers PTs 1 through 6. PTs 1 and 2, built on Crouch's design, were manufactured by the Miami Shipbuilding Company. The Bureau of Ships made considerable alterations to Crouch's design and had the Fisher Boat Works of Detroit, Michigan build PTs 3 and 4. PTs 5 and 6, were based on the Sparkman and Stephens design, but again, the Bureau of Ships did some modifications. Due to these modifications, the overall length of these two boats were stretched from seventy feet to eighty-one feet. These two boats were built by Higgins Industries, Incorporated of New Orleans, Louisiana — an outfit which would have an important role in the production of PT boats in the Second World War.

These three contracts were awarded in May and June of 1939 and in addition to the six boats built by these three yards, two Navy designs were produced by the Bureau of Ships. These two boats, PTs 7 and 8, were eighty-one feet in length and were built by the Navy in the Philadelphia Navy Yard. PT-7 was of wooden construction and was powered by four Hall-Scott engines coupled to two shafts. PT-7 was turned over to the British Navy during April of 1941. PT-8 featured the new technique of all-aluminum construction and was powered by four 1,000 hp Allision V-12 engines, arranged as two X-engines. These engines were "drag-started" at fifteen knots by a single 550 hp Hall-Scott engine. This engine was also used when the boat was backing down.

Due to the heavy construction techniques as well as the heavy Navy fittings used in these two boats, they were much slower than planned. These two boats never had satisfactory performance, as they were frequently breaking down. PT-8 was retained by the Navy and was reclassified as YP-110 in October of 1941. The boat ended the war years in remarkably good condition and because of this fact, the Navy kept her and used her for developmental purposes for their next generation of Patrol Torpedo Boats.

Even by 1939, all of the eight boats that the Navy had built were obsolete. On 3 January 1939, Charles Edison, the Assistant Secretary of the Navy told the General Board that a seventy foot British Motor Torpedo Boat was available. On 16 January 1939, ADM Thomas C. Hart, Chairman of the General Board sent a reply to Mr. Edison, which read, "Inasmuch as said design is known to be the result of several years' development, the General Board considers it highly advisable that such craft be obtained as a check on our own development."

Edison received approval from President Roosevelt for five million dollars of the original fifteen million. He planned on purchasing the seventy foot British boat, but such a move might have given ammunition to the argument that the Navy should spend that much money on an American produced boat, rather than a British design. He got around this bone of contention by suggesting that Henry R. Supthen, the Executive Vice President of the Electric Boat Company, travel to England, at his own expense, to investigate various British boats and try to purchase one. Not only that, but to also keep an eye out to find a way to have the boat licensed built in America.

Without even having a written agreement, Supthen, along with Electric Boat's chief engineer, Irwin Chase, left for England on 10 February 1939. Mr. Supthen could not have been a better choice for the trip. He was well known in England, especially in the Admiralty, during the First World War, Electric Boat had turned out five hundred fifty eighty foot Motor Launches (MLs) for the Royal Navy in four hundred eighty-eight days.

Also, before he left for England, he spoke with a representative from Scott-Paine, the seventy foot boat's designer. Together, Supthen and Chase inspected boats built by other English shipbuilders, namely Thornycroft and Vosper. The two of them were very impressed by the speed, maneuverability and seaworthiness of the Scott-Paine boat.

He was able to conclude arrangements to purchase one of the seventy footers, in addition to obtaining the American manufacturing rights. Supthen notified the Navy Department of the purchasing of the Scott-Paine craft on 17 March 1939. The Secretary of the Navy informed President Roosevelt of the proposed acquisition by letter. The President's response was a handwritten note on the bottom of the Secretary's letter, which stated, "O.K., if price is as low as the proposed American seventy footer."

Strangely, the cost for the engine development made the average price of the American boats more expensive than the quoted price of the Scott-Paine boat. The purchase contract was signed by the Navy on 1 June 1939. The Scott-Paine boat, now officially designated PT-9 arrived in New York as deck cargo aboard the liner SS PRESIDENT ROOSEVELT on 5 September 1939, two days after the outbreak of the Second World War. After its arrival, PT-9 was delivered to the Electric Boat Company (Elco) plant in Groton, Connecticut. Mr.Scott-Paine himself demonstrated the boat for a Navy trial board.

The boat's durability and speed impressed everyone on the trial board. At the time when Mr. Scott-Paine was proving his design's virtues, only two of the planned eight American boats were under construction. Armed with this knowledge, and the fact that, by this time, the American designs were obsolete, Assistant Secretary of the Navy Edison was confident recommending to President Roosevelt that the remaining five million dollars should be spent on a production order for as many of the seventy foot boats as Elco could produce.

PT-9

PT-9 was a seventy foot hull that was stepless with a hard-chine. The bottom, sides and deck were of double diagonal Mahogany planking sandwiched with a layer of glue impregnated airplane fabric. The hull had a distinct reverse sheer permitting a high freeboard forward and a low freeboard aft without a break in the line of the shear. To help provide for a more drier ride, the sides of the hull flared out from the chine to the gunwale, the flare being at its most pronounced toward the bow.

Because the hull was light weight, planing was accomplished more easily. The chine, which only curved up slightly at the bow, provided lift and spray rails located at the chine, just above the waterline, forced the bow wave beneath the boat. The benefit of this design permitted the boat to be trimmed on a level angle, and the planing area was distributed in a manner so that the entire hull would rise from the water as the speed increased.

The streamlining of the hull was achieved by a long, low trunk cabin that occupied half of the hull. There was a short, non-angular, enclosed pilot house about twelve inches taller than the trunk cabin. This was forward of a small (two and a half feet by five feet) open bridge from which the boat was conned when in action. All of the controls were completely duplicated in the open bridge and enclosed pilot house.

Behind the open bridge, there was a telescoping airfoil-shaped mast, and a life ring was fitted to the trunk. Further aft on the trunk cabin were two Dewandre .50 caliber machine gun powered turrets that were covered by Plexiglas domes. Running lights were located on each turret cylinder.

PT-9 also carried four eighteen inch trainable torpedo tubes, being the only English design that had trainable tubes, all of the other English boats of the time having fixed tubes. This type of tube became standard equipment on all later American PT boats.

PT-9 was powered by three 1,100 hp Rolls-Royce Merlin aircraft engines converted for marine use. The top speed with a full war load was a sustained forty knots, without the added weight of weapons and other combat equipment, the boat could get up to forty-four point four (44.4) knots.

Weighing in at thirty tons, PT-9 was lighter than most of the torpedo boats in service at that time. One difference between the Scott-Paine boat and the later Elco boats was that the two wing engines were direct drive and the center engine utilized a V-drive. If the crew just used the center engine, throttled back, an almost silent approach speed of ten knots could be attained. Like all PT boats which had hard chined, shallow V-shaped hulls, PT 9 had a tendency to pound heavily in anything but a smooth sea.

The armament of this boat was to set the standard for the weapons layout of all pre-war American PT boats, consisting of the four eighteen inch diameter torpedoes mounted in forward firing tubes and two twin .50 caliber machine guns turrets.

Elco signed the production contract on 7 December 1939 to build twenty-three, seventy foot boats based on Scott-Paine's design. Because Elco had to use PT-9 as a template to duplicate each of the parts to copy the boat, the Navy did not take official delivery of the boat, which was now the first American PT boat, until 17 June 1940. On 17 May 1940, the Navy had set up an official PT boat organizational system where three squadrons were to be placed into service.

Squadron 1 would be made up of all eight experimental boats that were then under construction. It should be noted that most of the eight, now obsolete, experimental boats were delayed in delivery because of engine development problems and PTs 1 and 2 never entered squadron service. This was due to the fact that they had to sit for a year in the builder's yard awaiting installation of their 1,200 hp Vimalert engines. When the engines were finally installed, it was found that the performance of the two boats was so poor that they were reclassified as small boats during 1941. The second squadron, Squadron 2, would be the first all-Elco squadron, consisting of PTs 9 through 20. The third squadron, would consist of Elco seventy footers, but these boats would not be armed as PT boats, these boats were armed with depth charges and other anti-submarine warfare gear and were designated as PTCs (Patrol Torpedo/Submarine Chasers). These twelve boats would become PT Boat Squadron 3, even though they were not true PT boats.

PT-9 was a Scott-Paine seventy foot design bought by the Elco during 1939. Since the boat served as a pattern for other Elco boats, the Navy did not take delivery of PT-9 until June of 1940. (Naval Institute)

ELCO PT-10 to 19 Class

Elco started construction of their seventy foot PT boats in January of 1940, at their plant in Bayonne, New Jersey. The construction of ten PT boats and the twelve PTCs was completed in just one hundred days. The first series of the new Elco boats was basically a moderately modified version of PT 9. The hull of the Elco boats remained the same as PT 9.

The major differences were seen at the deck level and above. The Merlin engines that powered the Scott-Paines boat were to be replaced by three 1,200 hp engines developed by the Packard Motor Car Company especially for the PT boats. These Packard engines would become the standard power plants of all American PT boats.

The most obvious changes were in the superstructure. The canopy, which measured thirty-five feet, six inches, was built in three sections that were removable. The pilot house in the forward section was enlarged and flushed with the trunk canopy. This was done to provide better wind and spray deflection from the open bridge. It also improved the lines of the superstructure. A space was created to stow deck gear by fitting a alloy boot to the front of the pilot house below the windows.

Later, this space was used for stowage of ready service magazines for the .30 caliber Lewis machine guns mounted forward of the pilot house. The bridge was enlarged and was lined with aluminum on the sides and the deck, a wooden grate covered was added to the deck in the bridge. Aluminum grab rails were fitted around the bridge and on top of the canopy. All controls, compass, warning buzzers, torpedo director, antenna and searchlight, as well as the ship's bell were located near the helm. Access to the enclosed cockpit was gained though a door on the starboard forward bulkhead of the bridge. The crew could climb into the bridge from the deck by using two steps that were built into the sides of the canopy. Life rings were carried on either side of the bridge.

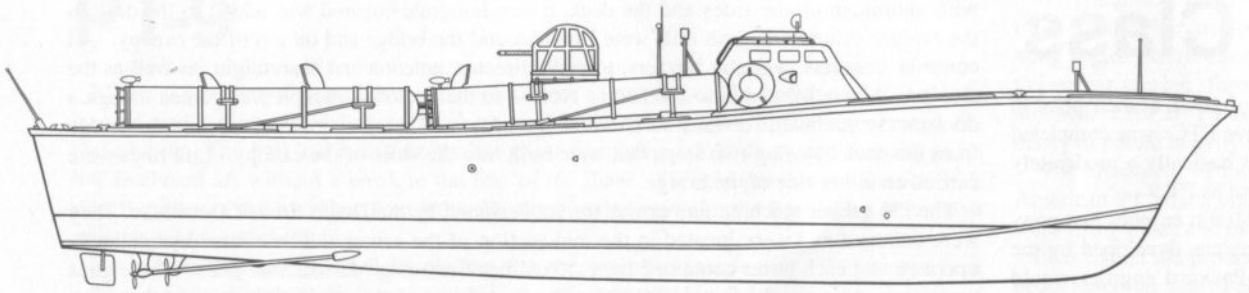
The .50 caliber machine gun power turrets designed by the Dutch firm of Dewandre. They were enlarged and were located in the mid-section of the canopy. These were hydraulically operated and each turret contained twin .50 caliber Browning M2 machine guns. These guns were housed in a multi-framed Plexiglas dome and were fed by ammunition belts that were carried in box type magazines attached to the guns themselves. Located between the two turrets, on top of the canopy, were two boat hooks. A folding hatch on the starboard side of the canopy was used to gain entrance from the deck. The after section of the canopy covered the engine room. Differences from the Scott-Paine design was that the grab rails were relocated from the side of the trunk cabin to the top. An access hatch to the engine room was located on top of the after section of the trunk cabin.

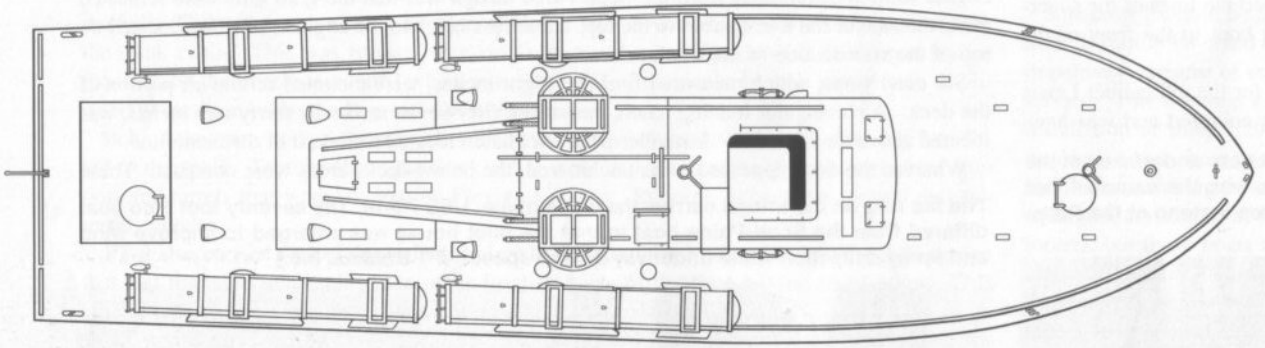
Six cowl vents, which measured four feet eight inches, were mounted on the aft portion of the deck. A rectangular loading hatch, measuring fifty-seven inches by thirty-two inches, was located above the lazarette. A smaller personnel hatch located starboard of the centerline.

Whereas the deck appeared to be uncluttered, the below decks areas were compact. These

PT-10 was the first of a production run of ten Patrol Torpedo (PT) boats undertaken at the Elco yards in Bayonne, New Jersey. The hulls of these ten boats was the same as that used on the earlier PT-9, but they were powered by Packard engines instead of the Rolls-Royce Merlin engines used in PT-9. (Naval Institute)

The life ring on the bridge carries the ships name, USS PT-10. The seventy foot Elco boat differed from the Scott-Paine boat in that the pilot house was enlarged to improve wind and spray deflection while underway at high speed. (PT Boaters, Inc.)





Specification
Elco PT-10 to PT-19 Class

Length.....70 feet (21.3 m)
Beam.....19 feet 11 inches (6 m)
Displacement.....33 tons (29,937 kg)

Powerplant.....Three 1.200 hp Packard liquid cooled engines
Armament.....Two twin .50 caliber Dewandre machine gun turrets and four MK VII torpedoes. Provision for two Lewis machine guns mounted on either side of pilot house.
Speed.....39 knots
Range.....550 miles (km)
Crew.....17

areas were designed to-save both weight and space. There was a passageway running from the anchor line locker, in the fore peak, aft alongside the crew's head. The crew quarters were very small, only measuring thirteen feet and contained eight berths, lockers and a small galley that had a sink, refrigerator and a hot plate. A ladder on the after bulkhead led to the pilot house, around the bridge and down to the chart room.

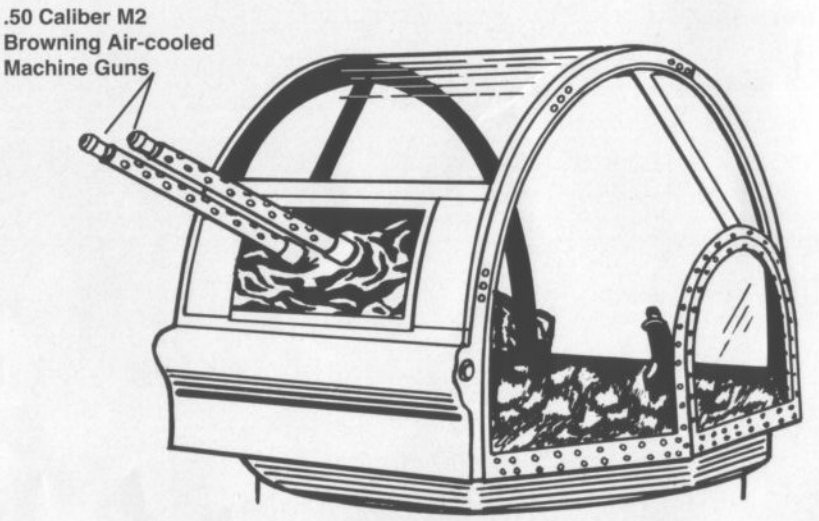
From the chart room, a companionway led to a ward room on the port side and a small radio room on the starboard side. A narrowing passageway passed between the two turrets and through a hatch into the engine room. Because of the low freeboard in that part of the boat, standing upright was impossible while in the engine room. A small rudder compartment was located just aft of the engine room.

Construction:

A hand hewn Alaskan Spruce keel and an S-shaped stem made of American Oak was the starting point of the construction of the seventy foot Elco boats. The small six inch by six inch keel was strengthened by a complicated system of four girders that ran the entire length of the boat. The frames were of African Mahogany with intermediate frames from frame twenty forward. The sides and the bottom were double planked Mahogany with canvas laid in marine glue in between the diagonally spaced planking.

Below the waterline, Monel screws were used, whereas above the waterline, brass or bronze

Dewandre .50 Caliber Machine Gun Turret



Twin .50 caliber Browning machine guns were used in the Dewandre powered turrets on the seventy foot Elco boats. These turrets were designed by a Dutch firm and were hydraulically operated. In the event, the enclosed turrets proved to be unsatisfactory and were deleted from later PT boats, but the twin air-cooled .50 caliber Browning machine guns were retained as standard armament (in various turret arrangements) on all later PTs. (Naval Institute)

screws were used. The deck was constructed from four inch planking laid double diagonally to the centerline with canvas in between. The inner layer was Mahogany and the outside decking was made of Teak.

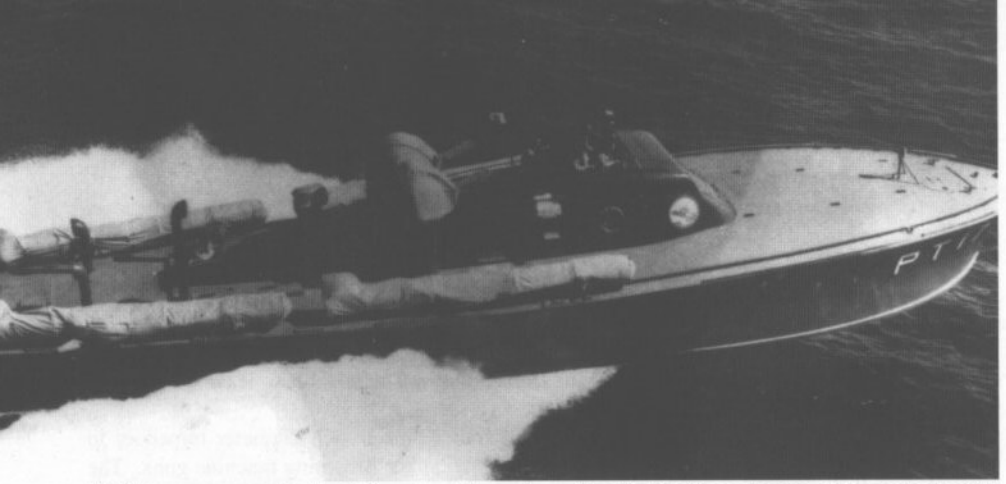
Weight saving efforts resulted in plywood gussets bored with several holes. The berth frames for pipes were made of aluminum alloy, as were the grab rails, which also doubled as conduits for wiring in some places. The interior deck, in removable sections, was constructed from Balsa which was covered with aluminum. Boat Cedar fitted with rubber insulating board formed the trunk formers. These were covered inside and out with plywood. the construction of the superstructure was done in a subassembly area,

Cabin drop windows were made of brass with a seven inch by twenty inch opening. The engine room hatch and the after portion of the trunk cabin was removable to leave a seven and a half foot square opening for the changing of the engines.

Armament for PTs 10 through 19 consisted of four eighteen inch diameter torpedoes in trainable forward firing torpedo tubes and two twin .50 caliber Browning machine guns. The choice to arm these boats with the smaller torpedoes was due to their size. Being only seventy feet long, there was not enough room to mount the longer, wider and more powerful Mark VIII torpedoes.

None of the ten seventy foot PT boats built by Elco ever saw combat while they were operated by the United States Navy. They did; however, see considerable action after they were turned over to the British under Lend-Lease. Before they went into British hands to become the 10th MTB Flotilla, the ten boats were put through major modifications. The ten boats were also renumbered MTBs 259 through 268, and they saw action in the Mediterranean Theater of

PT-17 of Squadron Two at high speed off the U.S. East Coast during March of 1940. She was later turned over to the British as MTB 266. She was lost in action during April of 1944.



PT-17 was a seventy foot Elco boat based on the Scott-Paine design. She served with Torpedo Squadron Two for a short period before being turned over to the British Navy under Lend-Lease. (Naval Institute)

Operations throughout the war.

The modifications made to each boat to bring it to British specifications were as follows:

The four eighteen inch torpedo tubes were removed and, after the installation of strengthening plates, two Royal Navy pattern fixed angle twenty-one inch torpedo tubes were installed. Associated loading rails and mounts were also fitted. The forward mounting pads of the torpedo tubes were six inches aft of the end of the scalloped toe rails.

The edge guards by the forward torpedo tubes were extended three inches at its maximum width. The after extensions of the old eighteen inch tubes were retained.

The Plexiglas domes of the Dewarndre turrets were removed, although the Browning .50 caliber machines guns were retained, along with their box type magazines.

A shielded, single 20MM Oerlikon cannon on a Mark IV adjustable mount was installed on the stern.

Forward to the 20MM cannon, a contoured pipe depression rail was installed to protect the forward sections of the boat. Two ready service lockers were fitted transversely on the stern for 20MM ammunition drums.

Twin .303 caliber Lewis machine guns were installed just forward of the boot and mid-way between the cockpit and the toe rail, on mounting pads and stanchions.

Two depth charges with roll-off racks installed on either side of the 20MM cannon on the stern.

Mufflers were installed on the two wing engines.

It is interesting to note that, in 1943, four seventy footers of the Scott-Paine design, built by the Canadian Power Boat Company were turned over to the U.S. Navy in a reverse lend-lease agreement. These four boats were originally built for the Dutch Navy, but were then turned over to the Americans as PTs 368 to 371. After they had Elco fittings installed, they saw action in the New Guinea campaign, where two of the boats were accidentally put hard aground and had to be destroyed by their crews to prevent them from being captured by the Japanese.

During the shakedown deployment of PTs 10 to 19 along the Atlantic coast and into the Caribbean, weakness in the hulls of the seventy footers became readily apparent, but the design of the Elcos as a platform for firing torpedoes at surface targets was just what the Navy wanted. The only drawback of the seventy footers was that the American twenty-one inch diameter torpedoes were four feet longer than the eighteen inch torpedoes carried by the boats. Meaning that they could not fit onto the seventy footers, not to mention that the Navy only had a small stock of the smaller diameter torpedoes.

The Bureau of Ordnance (BuOrd) recommended that the length of all succeeding PT boats be lengthened from seventy feet to about eighty feet.

This seventy-seven foot Elco boat has been modified for delivery to the British Navy. The Dewarndre turret domes have been removed, although the twin .50 caliber machine guns were retained. These boats served with the 10th MTB Flotilla. (Naval Institute)

ELCO PT-20 Class

As a result of the BuOrd decision, Elco was awarded a contract to build twenty-four of the longer seventy-seven foot PT boats, numbered PTs 20 to 44. Even though they looked like someone just added seven feet to a seventy foot PT boat, these new boats were a totally new design. The reverse sheer of the hull was not as pronounced as it had been in the seventy foot boats and the distance between the cowl vents on the stern also showed the new length to good advantage. Considerable strengthening of the hull could be seen below decks and intermediate framing was added in the forward section in the pounding area.

The system of longitudinals that had been proven to be weak and disappointing in the seventy foot Elcos were strengthened in the new seventy-seven foot boats. Compartmentation and the main frames were identical in both series forward of the engine room. From the location of frame 41, which was the start of the engine room, back the boat was modified considerably. Eighteen inches were added to the engine room and the lazarette was enlarged by five and a half feet, this totaling seven feet.

The trunk cabin was also lengthened by two feet three inches. Nine inches were added to the pilot house section, which gave the cabin a more flowing appearance than the cabin of the seventy footers, which seemed to be somewhat fat in appearance. The cockpit was redesigned, especially the curve, and the sides and the rear portion of the bridge were flattened.

Alterations were also made to the last three side windows of the pilot house and a horn was placed on top of the pilot house. The Dewandre turrets were replaced with a newer and simpler Elco turret design. To limit the firing arc of the .50 caliber machine guns, depression rails were fitted to the turrets.

Standard issue Mark XVIII torpedo tubes were mounted on deck to carry the Mark VIII twenty-one inch torpedoes. This was done to alleviate the problem of shortage of the English eighteen inch torpedoes. The small access hatch to the lazarette was moved to the center of the main lazarette hatch. On the bow, a pair of .30 caliber Lewis machine guns on pedestal mounts were installed on either side of the pilot house, just forward of the pilot house structure.

In May of 1941, the Navy decided to hold a completion to determine what types of boats would be chosen for the construction programs included within a fifty million dollar appropriation for the 1941 fiscal year. Comparative service tests would be conducted between several second generation boats that were under construction.

The first competition was held in July of 1941, and a second one was held in August. This second competition was held because one of the competitors felt that he did not receive a fair evaluation of his boat design. The participating boats were rated on their structural efficiency, habitability, access, arrangement of control and communications facilities, tactical diameters, seakeeping qualities, maximum sustained speed, maneuverability and standardization. As part of the competition, the boats had to run a hundred ninety mile circuit. The layout of the circuit, which on both occasions became an all out race between the competitors, started at New London, Connecticut. From there, it went around Block Island; out to the Fire Island Light Ship, around the Montauk Point Whistling Buoy and then back to New London. These runs were unofficially named "The Plywood Derbys".

Several of the new seventy-seven foot Elcos were completed by the competition dates and were entered into the two competitions. After experiencing difficulties trying to build the Sparkman-Stephens designed PT-6, the driving force of Higgins Industries, Inc, Andrew Jackson Higgins, using his own finances, designed and built a boat of his own with an understand from the Navy that if the boat proved itself to be satisfactory, it would be purchased. This seventy-six foot design was represented in the competition by PT-70.

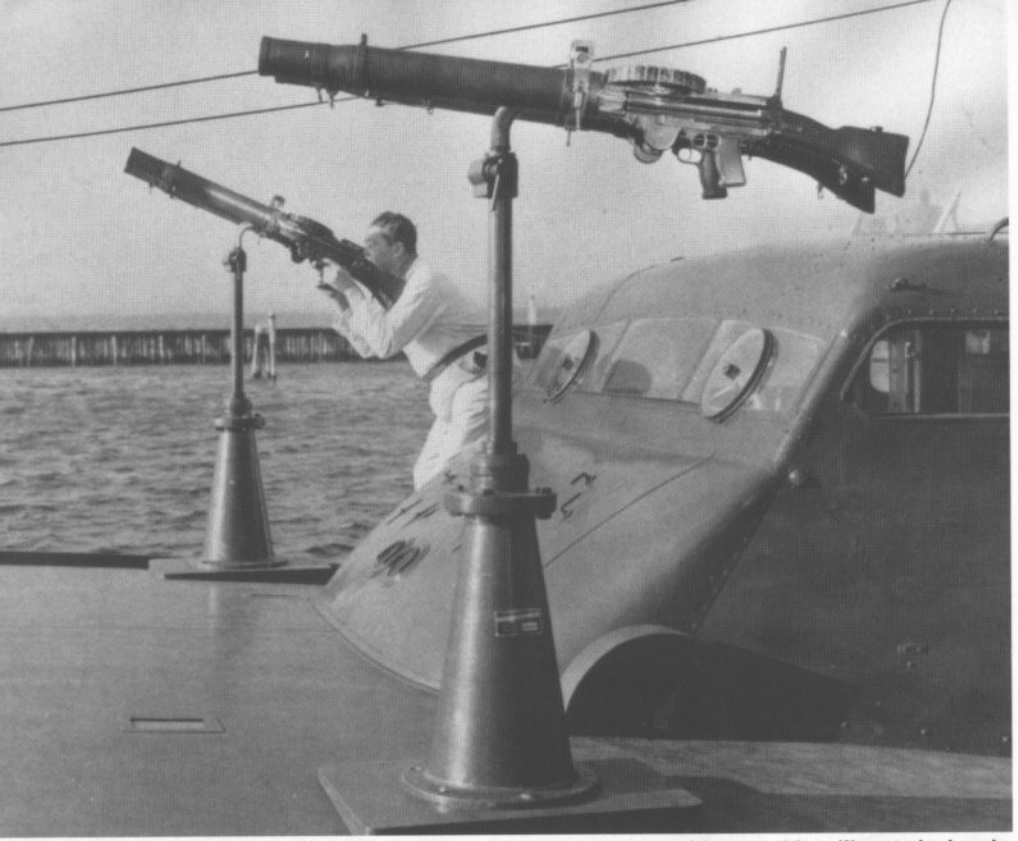
PT-70 was powered by three Packard engines, as were all of the Elco boats and the seventy-eight foot boat also designed by Higgins. Extensive testing on PT-70 was possible because it had been delivered to the U.S. Navy several months before the competition date arrived. The boat was well liked by all concerned, it handled very well and could almost match the speed of the Elcos. And, to the delight of the crews that went out on it, the boat did not pound as much as the Elcos did when they were in a heavy sea.

Another strong contender in these competitions was the entry designed and built by the Huckins Yacht Corporation of Jacksonville, Florida. This seventy-two foot boat was of Huckins' design and was built using the company's own money and, like Higgins, they had an agreement with the Navy that, if the design proved to be worthy of the Navy's attention, it would be bought.

The Huckins' boat, designated PT-69, was powered by four Packard engines, which were on loan from the Bureau of Ships, and was accepted by the Navy. Huckins was awarded a contract for eight boats, but before production got underway, the design of the boat was changed, with an additional six feet being added onto the overall length, to make the boat seventy-eight feet long and having the number of engines reduced to three Packard power plants. All of these changes were made at the request of the Navy.

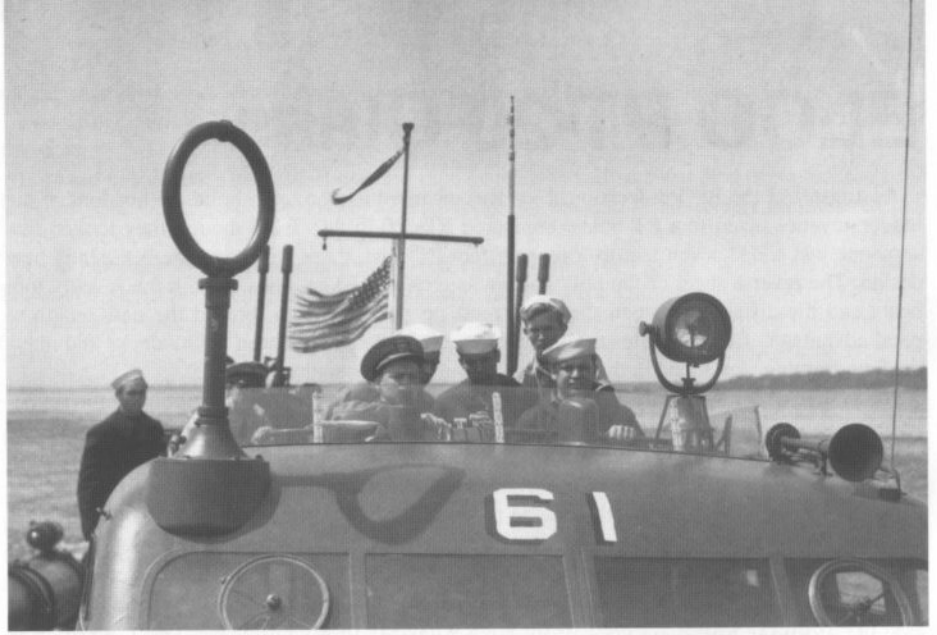
Although Huckins had a contract to build eight boats of the now altered design, the prototype boat, PT-69, was never placed in squadron service. In September of 1942, it was reclassi-

PT-20 was the first seventy-seven foot Elco PT Boat. She saw service with Torpedo Squadron One and was at Pearl Harbor during the Japanese attack. She later saw service in the Aleutian Islands. (Naval Institute)



The seventy-seven foot Elco PT boat could be fitted with two .30 caliber twin Lewis machine mounts on either side of the pilot house. These guns were fed from round magazines mounted on top of the gun. (PT Boaters, Inc.)

PT-32 was stationed in Manila Bay, the Philippines with Squadron 3 during the opening stages of the Second World War. The 32 boat was destroyed by friendly fire after completing the MacArthur evacuation mission from Corregidor. (Naval Institute)



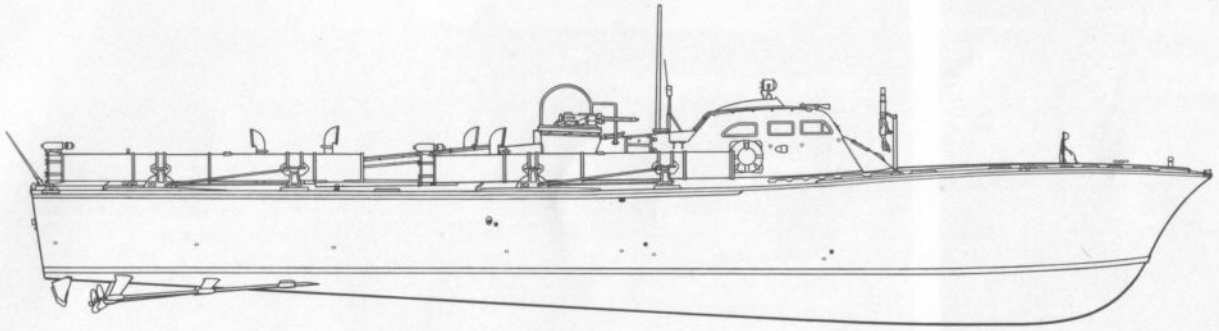
PT-61 mounted a direction finder antenna on the starboard side of the pilot house, a searchlight on the ports side along with a horn. The radio mast, visible between the two sailors, telescoped and was extended to its full height only when necessary. (National Archives)

fied as a district patrol vessel YP-106. Heavy sea conditions were experienced on the days that the test runs were conducted, but all of the boats took these sea conditions in stride. From these two "Plywood Derbys", it was observed that the seventy-seven foot Elco boats were the fastest and had the driest ride of the three types (Elco, Higgins and Huckins). The Higgins was the second best boat and had a tighter turning radius than the Elco design. The Huckins design was far less desirable than either the Elco and Higgins craft, but was judged to be good enough to be put into production.

Even though that the seventy-seven foot Elco and the seventy-eight Higgins were good designs, the Navy felt because of the ordnance the boats would be carrying, that the overall size of the boats would have to be increased. The three companies that were the survivors of the "Plywood Derbys" were asked to submit design proposals for boats between seventy-five to eight-two feet. From these proposals, it was determined that Elco was to be awarded a contract for thirty-six boats of their eighty foot design.

Higgins had a contract for twenty-four of their seventy-eight foot boats and Huckins won a contract to build eight boats of their seventy-eight foot design. But as of 7 December 1941, none of these new designs were in service and all the Navy had on hand was a small quantity of the Elco seventy-seven foot boats.

Twelve boats of Squadron 1 were at Pearl Harbor when the Japanese attacked on 7 December 1941. PT-20 to 25 were tied up at the submarine base and when they saw the attacking aircraft start their runs, they opened fire. These boats may have downed two Japanese aircraft PT-26 to 30 and PT-42 were being readied to be transported to the Philippines. They already had their gas tanks emptied and filled with C02, to reduce the chances of having a fire being started while enroute. Because they could not use their engines to provide power to the turrets, the crews had to cut the hydraulic lines to the turrets and man-



Specification
Elco PT-20 Class

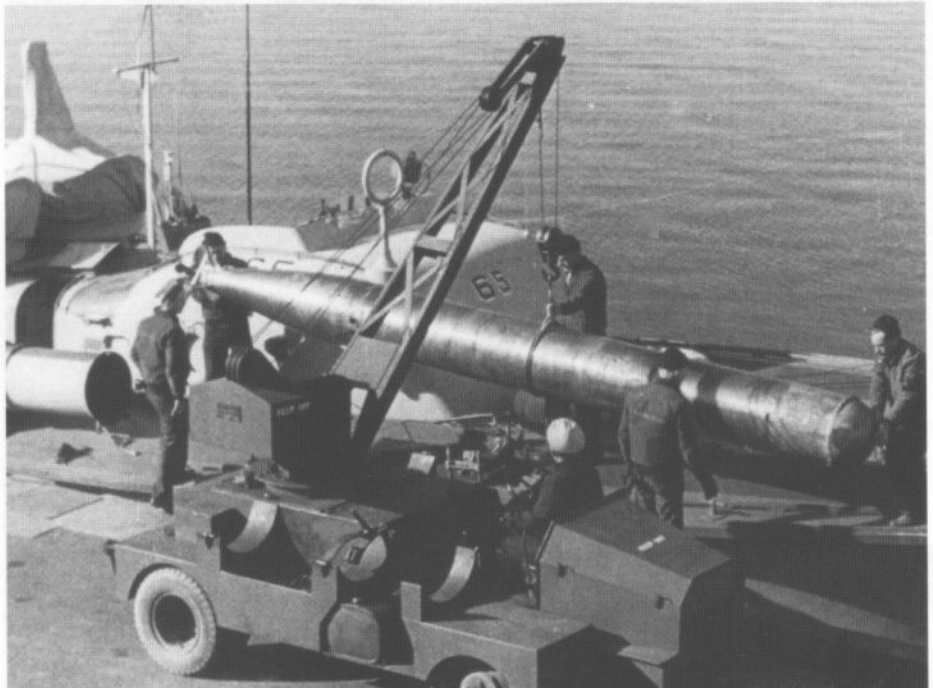
Length.....77 feet (23.5 m)
Beam.....19 feet 11 inches (6 m)
Displacement.....33 tons (29,937 kg)

Powerplant.....Three 1.200 hp Packard liquid cooled engines
Armament.....Two twin .50 caliber Elco machine gun turrets and four MK VII torpedoes. Provision for two Lewis machine guns mounted on either side of pilot house.
Speed.....39 knots
Range.....550 miles (km)
Crew.....17

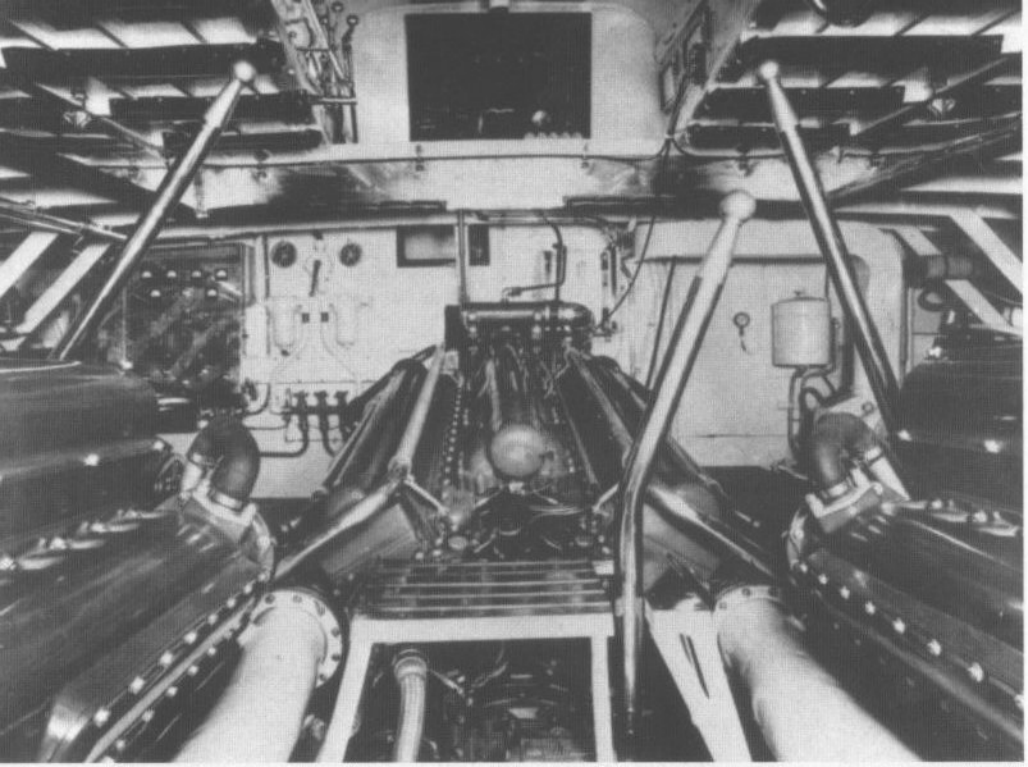
ually operate the guns. These five boats were being transferred to Squadron 3 that was based in Manila Bay, but the advancement of the Japanese forces made the delivery of these boats to the Philippines impossible. Five of them were put back in the water and were used for anti-submarine patrols in Hawaiian waters. For this role, the boats had their after torpedoes replaced with eight 300 and 600 pound depth charges.

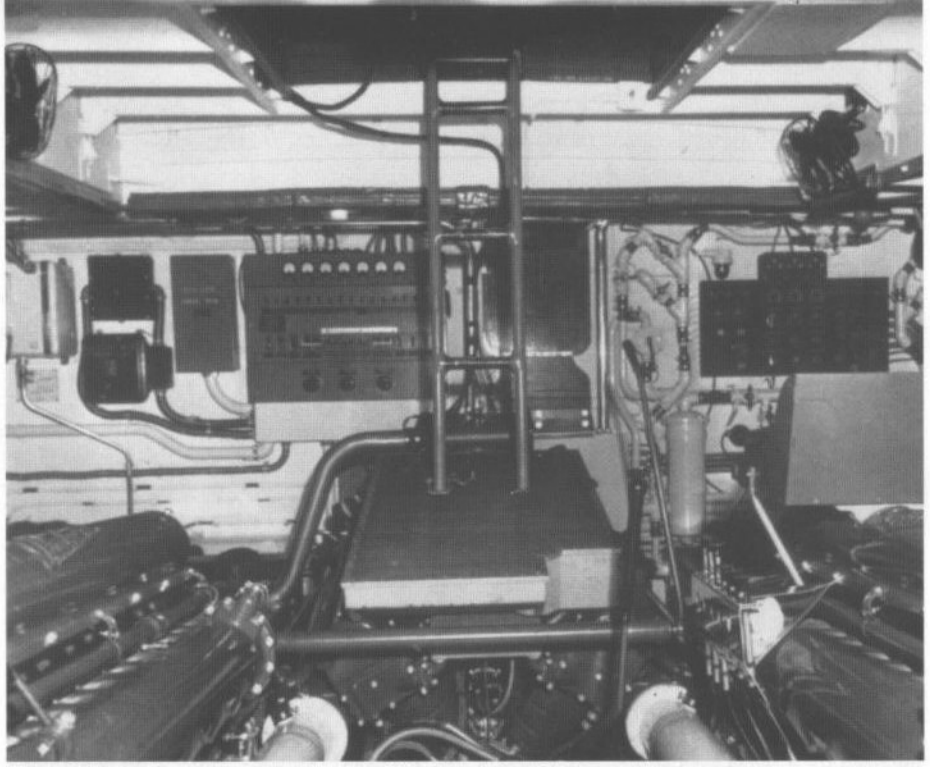
It is often believed that, the eighty foot Elco PT boat was designed because of the battle-related shortcomings of the seventy-seven foot Elco. This is not the case, the Navy had seen the need for a larger boat at the completion of the "Plywood Derbys". Plans were being made to have the Elco plant switch from the production of the smaller boats to the eighty foot boats before the war began. The phasing out of the seventy-seven foot boats was being carried out while Elco still had to build and deliver twenty of the smaller boats that the contract called for.

Crewmen use a torpedo handling dolly to load a Mk VII torpedo into the forward torpedo tube of PT-65 while the boat was moored dockside at Melville, Rhode Island during October of 1942. (Naval Historical Center)

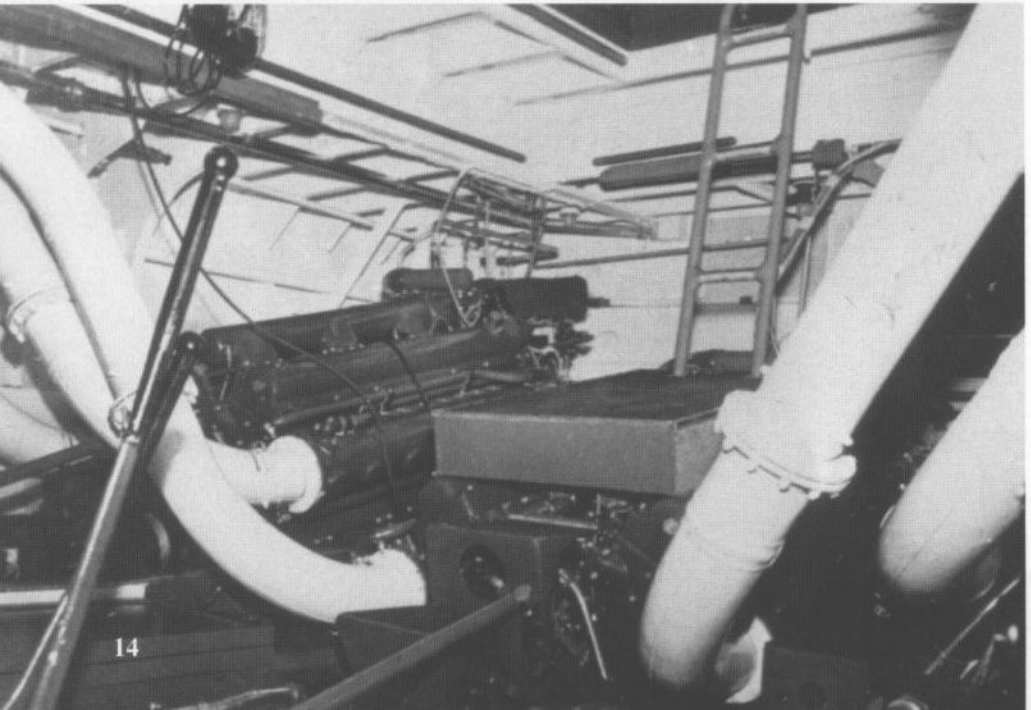


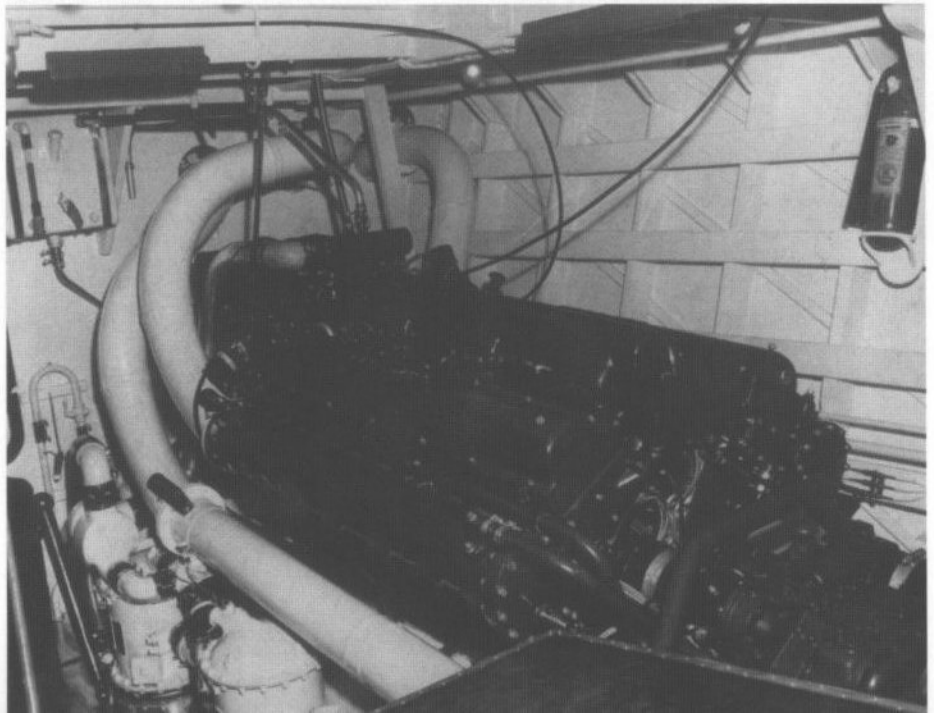
A number of early seventy-seven foot PT Boats had their after torpedo tube removed and replaced with depth charge racks for anti-submarine duties. Two sizes of Type C depth charges, 300 or 600 pound, could be carried on either side of the stern. (PT Boaters, Inc.)

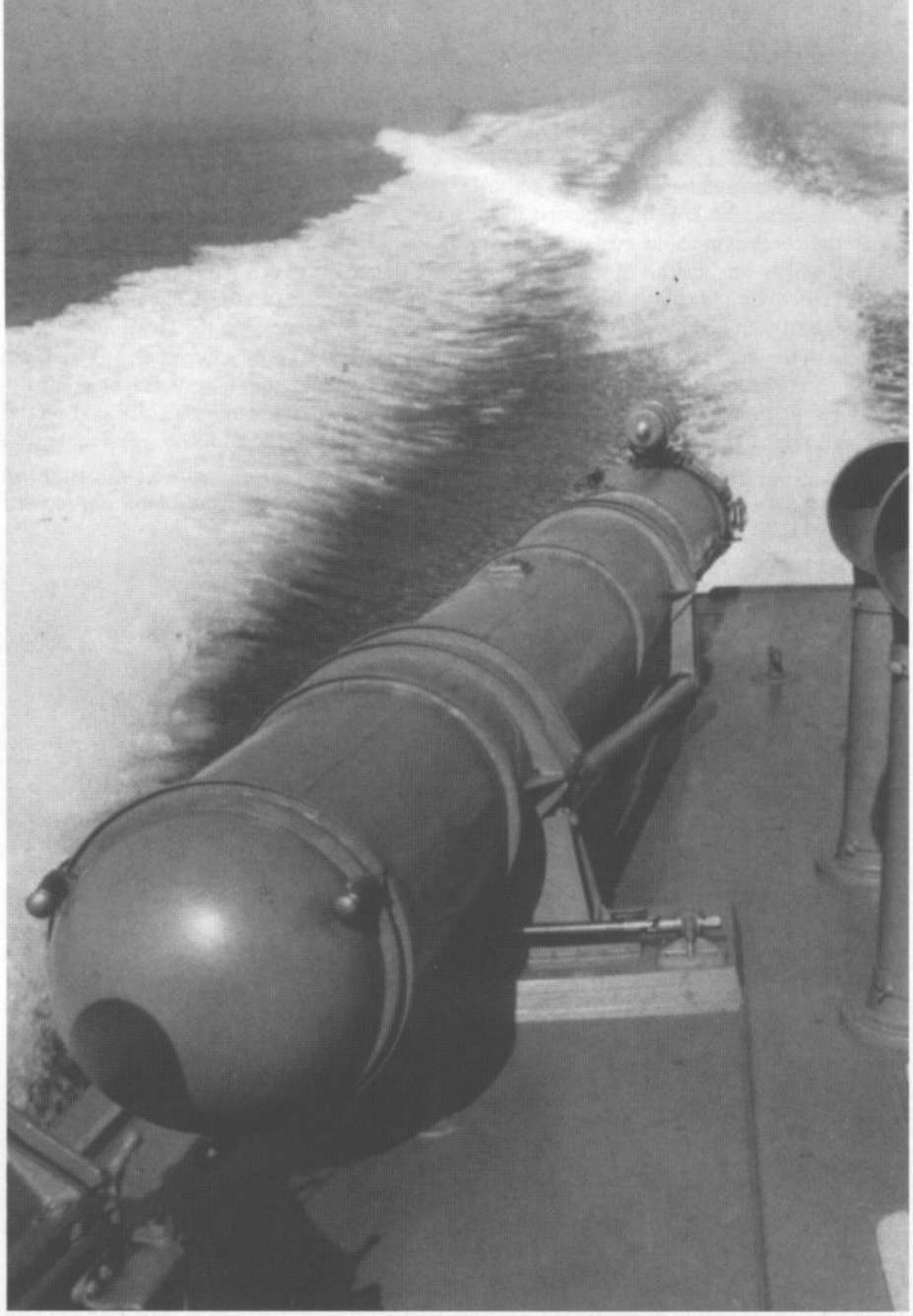




The engine room of a Elco seventy-seven foot PT boat contained three 1,200 hp Packard liquid cooled engines and all their associated equipment. The engines were arranged one on either side and one in the center. The piping in the foreground (lower right) carried cooling water to the engines. The three handles (top right) were the throttles for each engine, these were controlled by the Engineman, who had the responsibility of maintaining and operating the engines. (PT Boaters, Inc.)







The after torpedo tube of a Elco seventy-seven foot PT boat. The tube is sealed with a dome cover on the forward end to keep out sea spray. Prior to going into action, the Torpedoman would remove the cover to prepare the torpedo for firing. The tube could be trained in and out along the track mounted at the front of the tube. (PT Boaters, Inc.)

The dome cover has been removed from this torpedo tube and the MK VII torpedo is ready for firing once the tube has been trained outboard. The training control is the rod extending inboard from the forward portion of the tube. The firing charge is located in the small cylinder mounted above the after portion of the tube, (PT Boaters, Inc.)

Higgins PT-71 Class

The Andrew Jackson Higgins company, located in New Orleans, Louisiana, built one hundred ninety-nine of the seventy-eight foot boats. Of those, one hundred forty-six saw service in the United States Navy, while the remaining fifty-three served in the Navies of Britain and Russia.

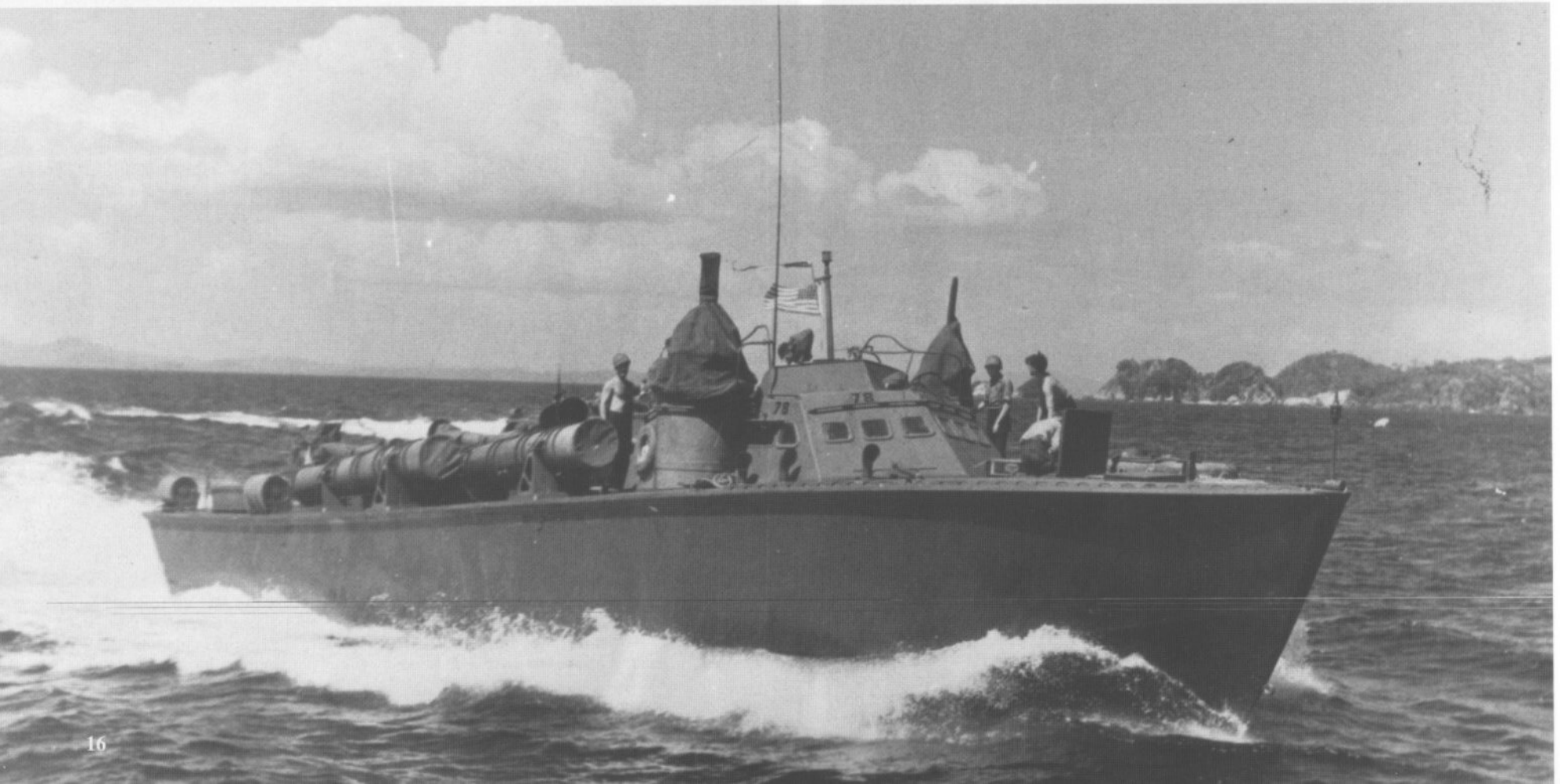
These boats did not have the graceful lines of the eighty foot Elcos and because of this, Elco crews often described the Higgins boats as a box with a point at one end. The Higgins boats could obtain a top speed of forty-one knots, which was about a knot slower than the Elco eighty foot boats. Even though the Higgins seventy-eight foot boats were slower, they had a tighter turning radius than the Elco eighty foot boats.

This fact was very important, especially when the boats were being used in the barge-busting role or when the boats were evading attacking aircraft. The advantage this capability held was overshadowed by the fact that the crew of a Higgins boat could expect a very wet ride during these maneuvers.

The seventy-sight foot boat had a beam of nineteen feet, five inches, a draft of five feet, a displacement of forty-three tons and could obtain a top speed of forty-one knots. The hull, while being stubbier than the Elco, was sharp hard chined V bottom, stepless type with its sides flaring out from the chine to the gunwale, with a flushed deck.

Above decks, the Higgins appeared to have more spacious deck area than either class of Elcos, the chartroom cabin was small in size and was located well forward on the hull. The cockpit, which was just aft of the chartroom, was situated between the two plywood turrets that held the twin .50 caliber Browning machine guns. Because of this, the gunners on board the Higgins boats had a more limited field of fire than the gunners on the eighty foot Elcos. Because of the fact that half of the length of the hull was taken up by a large engine room, the crew quarters of the Higgins were small and cramped. A sixteen foot long V shaped compartment was where the crew slept, berthing for eight men, the crew's toilet was located on the starboard side and the fully equipped galley was on the port side. The folding mess table was

PT-78 was an early production seventy-eight foot Higgins boat built at the Higgins Industries City Park Plant in New Orleans, LA during 1943. She would later serve with Squadron 13 in the Aleutians and Southwest Pacific.

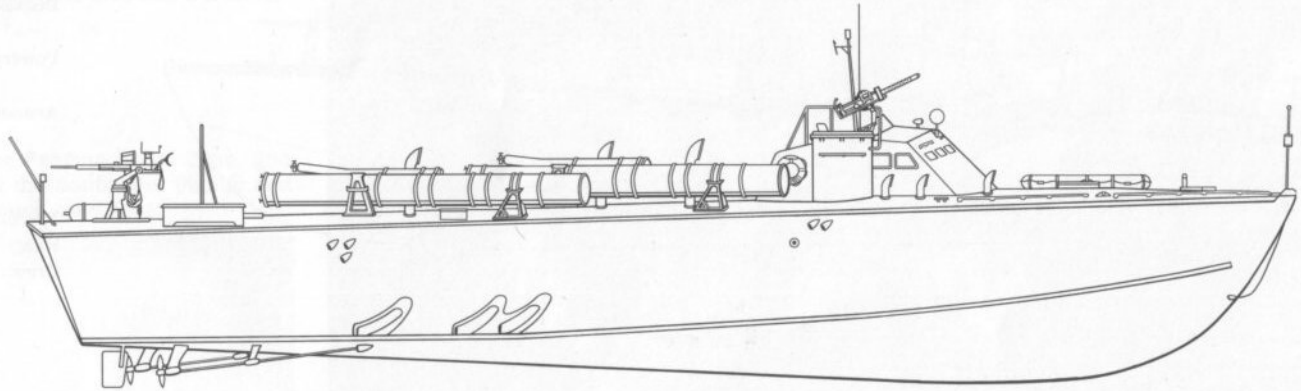


Specification
Higgins PT-71 Class

Length.....78 feet (23.7 m)
Beam.....19 feet 5 inches (5.94 m)
Displacement.....43 tons (39,009 kg)

Powerplant.....Three 1.200 hp Packard liquid cooled engines
Armament.....Two twin .50 caliber machine gun turrets, one 20MM cannon and four Mk VII or VIII torpedoes.
Speed.....41 knots
Range.....550 miles (885 km)
Crew.....17

Higgins Seventy-eight Foot PT-71 Class



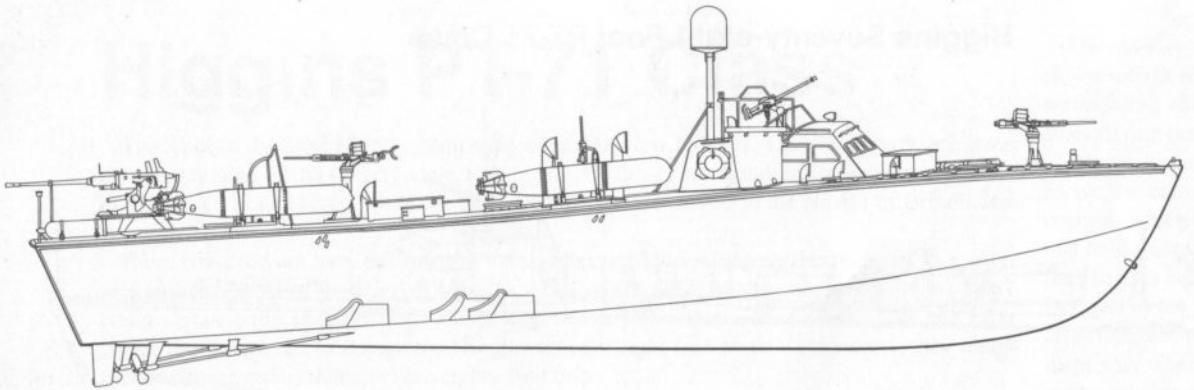
PT-200 was another early seventy-eight foot Higgins PT boat. The Higgins boats were armed with twin .50 caliber machine gun turrets, four torpedo tubes and a 20MM cannon on the stern. PT-200 was later sunk after she collided with a tanker off of Newport, Rhode Island during 1943. (PT Boaters, Inc.)

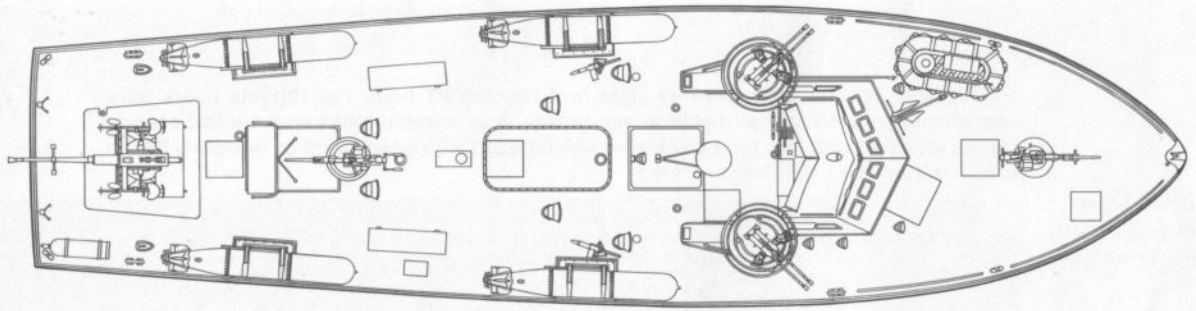
located in the center of the compartment near the ladder that led to the forward hatch. Directly below the chartroom was the gun locker and the officer's quarters and their toilet was located between the two eight hundred gallon gasoline tanks. Four thirty gallon water tanks were located in the bilges under the crew's quarters and ward room.

The layout of the engine room was designed with ease of maintenance in mind. The center engine was set a little aft of the two wing engines, this left room for the motor machinist mates to do maintenance on the engines. Alongside the center engine were the work bench, two battery boxes, the auxiliary generator, heater and the air compressor. Unlike the Elcos, which had their mufflers located at the stern, the Higgins had their mufflers at the sides of the boats. Two seven hundred gallon gasoline tanks were also located in the engine room. The lazarette was just aft of the engine room. Unlike the earlier Elcos, all of the Higgins boats had all three of the engines driving the three propeller shafts directly. Rather than using the V-drive system that just used the two wing engines to drive all three shafts.

Direct drive held an advantage over the V-drive system simply because there were no extra gearing that tended to cut down on engine output. Not to mention that the gearing units were just another piece of equipment that needed maintenance or that could break down at some critical point in time.

Originally the Higgins boats were equipped with standard torpedo tubes and Mk VII or VIII torpedoes. Late series boats (197 and later) were retrofitted with the Mk XIII and its light weight rack. These late production boats also carried heavier gun armament including a 40MM Bofors mount on the stern and other late war armament modifications.



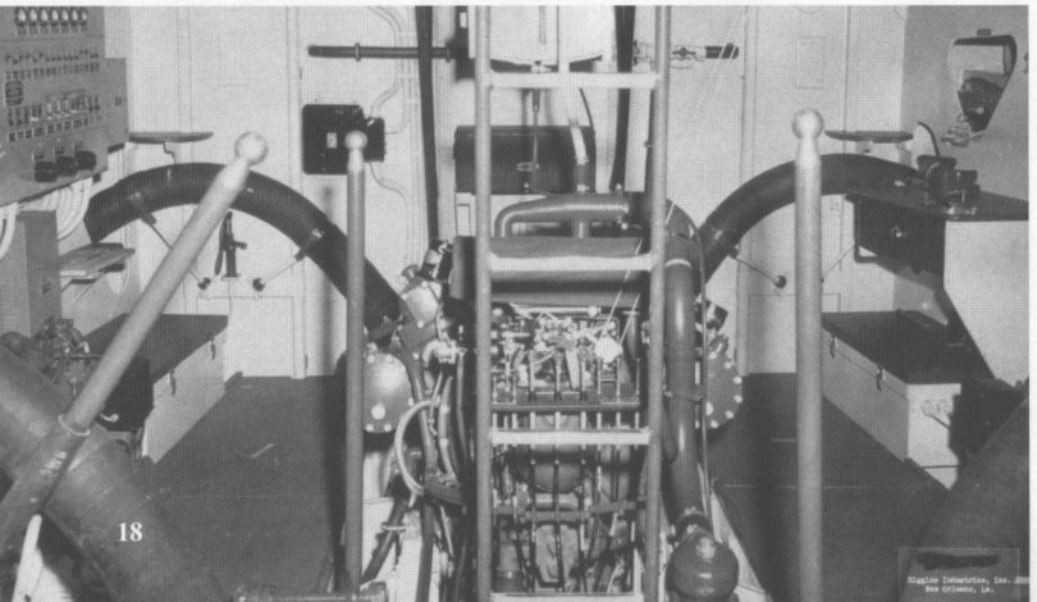


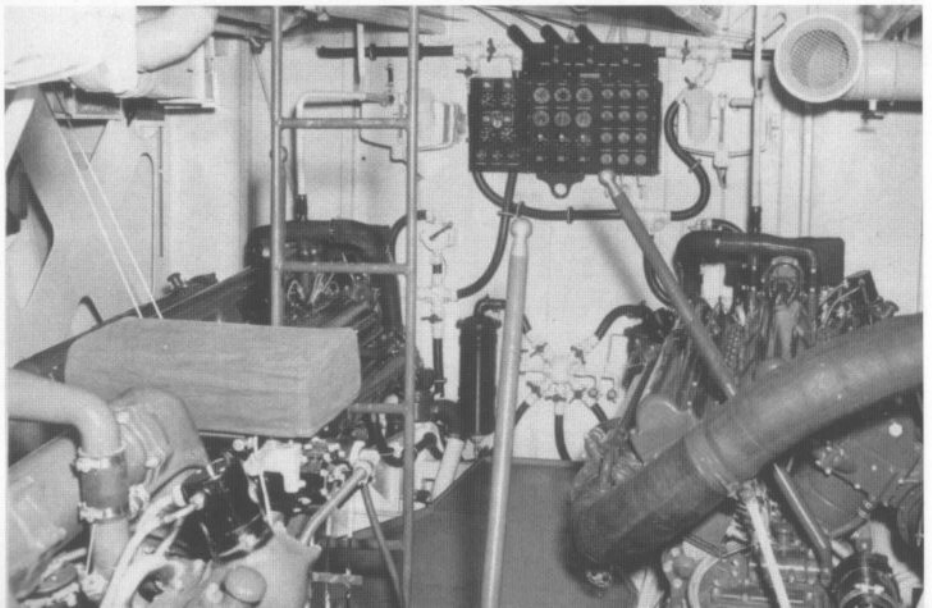
Specification
Higgins PT-200 Subclass

Length.....78 feet (23.7 m)
Beam.....19 feet 11 inches (6 m)
Displacement.....43 tons (29,937 kg)

Powerplant.....Three 1.200 hp Packard liquid cooled engines
Armament.....Two twin .50 caliber machine gun turrets. Four MK XIII torpedoes. Two 20MM cannon and one 40MM Bofors cannon on the stern.
Speed.....41 knots
Range.....550 miles (km)
Crew.....17

The layout of the engine room was designed for ease of maintenance. The center engine was set a little aft of the two wing engines, leaving room for the motor machinist mates to do maintenance on the engines. (PT Boaters, Inc.)





(Right) This seventy-eight foot Higgins boat has been modified by its crew to carry extra armament. Besides its standard weapons, the crew has added a pair of 20MM mounts forward of the bridge and another pair aft of the .50 caliber turrets. She also has the aft torpedo racks replaced by depth charge racks. (PT Boaters, Inc.)

PT-285 underway at high speed on a training cruise off the Panama Canal Zone. She would later serve with Squadron Twenty-Three in the both the Southwest Pacific and South Pacific areas of operations. She saw action at Palua during early 1945.

A Torpedoman releases a Mk XIII steam driven torpedo after the captain has electrically fired the torpedo from the cockpit. Once the torpedo starts running, the Torpedoman pulls the release lever, dropping the weapon over the side of the boat. The White plume behind the torpedo is escaping steam, (National Archives.)

Late production seventy-eight foot HIggins boats mounted a 37MM cannon on the bow and two Mk 50 rocket launchers that fired the five inch fin stabilized rocket The 37MM gun was originally developed for use in the Bell P-39 fighter aircraft. Crews in the Solomons first installed this gun, salvaged from crashed P-39s, to increase their firepower against Japanese barges.

The eight tube Mk 50 rocket launcher gave the small PT boat the same firepower as a destroyer. The rocket launchers were rotated outboard before firing to keep the back blast clear of the deck.

PT-631 was one of a number of seventy-eight foot Higgins boats that were transferred to the Soviet Union after a short period of service with Squadron 43.

PT-95 Class Huckins Boat

There was another class of PT boat that saw service with the Navy, the Huckins' seventy-eight foot PT-95 class. These were built by the Huckins Yacht Works of Jacksonville, Florida.

Eighteen boats in two series were built by Huckins, PT-95 to 102 and PT-255 to 264. These boats had a length of seventy-eight feet, a beam of nineteen feet, five inches and a displacement of forty tons with a full warload. These boats were designed to be light boats with very low profiles. Their hull design made the boats plane on the water, rather than cutting through it like the other designs.

(Right) PT-95, a Huckins seventy-eight foot PT boat at sea off Jacksonville, Florida on 14 July 1942. There were only eighteen Huckins boats built, PT-95 through PT-102 and PT-255 through PT-264.

PT-95 during at sea trials off Jacksonville, Florida on 4 July 1942. The Huckins boats were lighter than both the Elco and Higgins boats. These boats were not successful and did not enter widespread use.

PT 259 was one of the second production batch of seventy-eight foot Huckins boats (PT-255 to PT-264) built for the U.S. Navy. At one point in her career she carried the name Little Joe. She was assigned to SquadronTwenty-six and operated in Hawaiian waters throughout the war. She was armed with twin .50 caliber gun turrets, a 20MM cannon on the stern and four torpedo tubes.

ELCO PT-103 CLASS

The keel of PT-103, the lead boat of the new eighty foot class of Elcos, was laid down in January of 1942, but was not completed until 16 May 1942 when, at a ceremony to honor it, it was lowered into the East River. In addition to being three feet longer than the earlier seventy-seven foot boats, the new eighty foot boats were a totally new design. The new boat drew on the experience that Elco had gleaned from its two earlier designs. It was a heavier boat, at thirty-eight tons as compared to the thirty-three tons of the seventy-seven foot boats. The eighty-foot boats were slightly slower than the earlier PT 20 class boats and were also not as maneuverable. What was lost in speed and maneuverability was made up for in sea-keeping qualities. It was a better riding boat than the seventy-seven foot boats and it could obviously carry a larger warload. The boat's freeboard was considerably raised from that of the earlier seventy-seven foot boats. It had a draft of five feet, three inches and the beam (width) was twenty feet, eight inches at the widest point. Although the construction of the eighty foot was very similar, if not identical to that of the seventy-seven foot boats, the eighty foot boats were stronger. Secondary frames were placed where stress on the hull was the greatest, and in the three forward compartments. To strengthen the area around the compartment that held the gas tanks and the engine room, Elco used Mahogany blocking to make a solid foundation for these two areas. The intercoastal knees, made of plywood, that were used to join the deck and hull on the seventy-seven foot Elcos were replaced by a single piece that went the entire length of the hull.

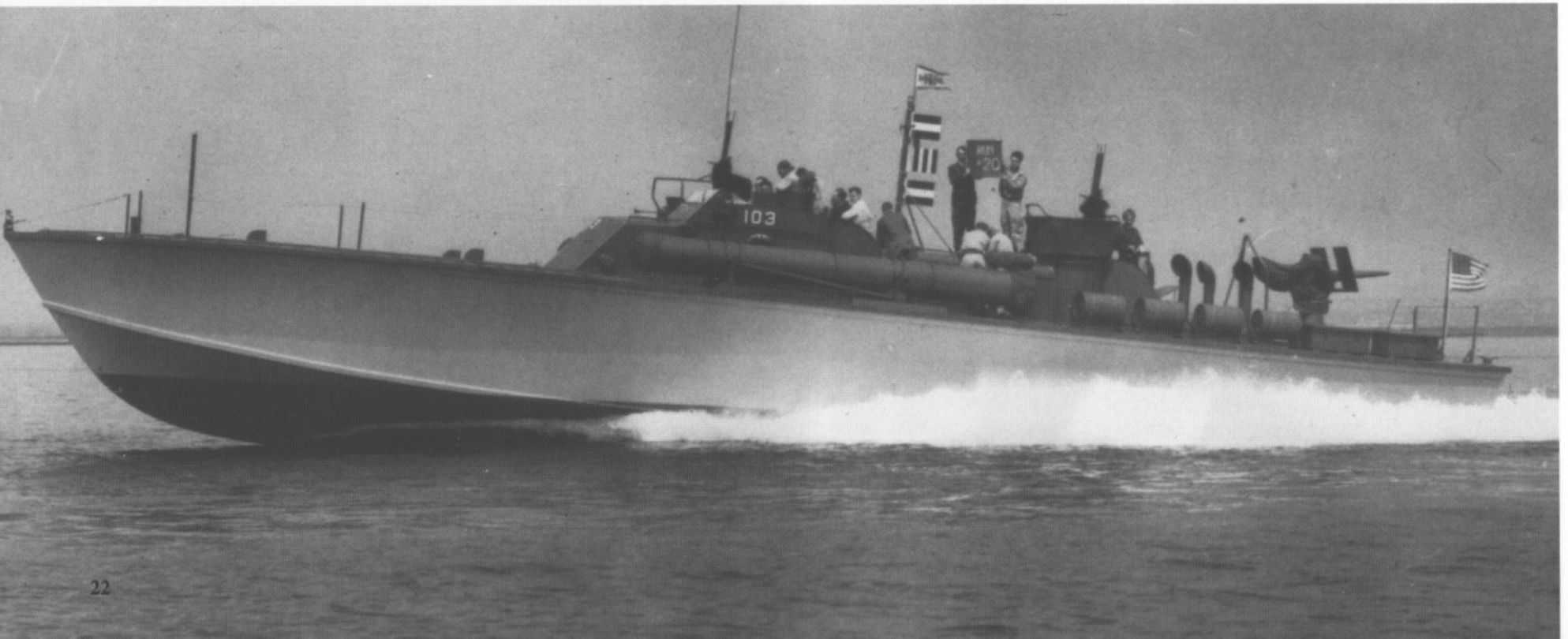
The crew accommodations on board the new Elcos were very well designed and had almost everything that an eleven man crew would need to stay aboard. The deckhouses were covered in plywood and hatches were installed for easier removal of the gas tanks and the three Packard engines. Engine rooms on board the eighty-foot Elcos had almost the same layout as in the seventy-seven foot boats; however, they had no automatic discharge for the fire extinguisher.

From 1942 to 1945, Elco turned out a total of three hundred twenty-six of the eighty foot design. An eighty foot Elco that was built in 1942 was externally identical to one that was factory fresh in 1945, but due to engineering advancements and weapon systems changes throughout the war, the boats changed drastically from year to year. In 1942, an eighty foot Elco weighed in at thirty-eight tons.

These boats designed strictly for the fast torpedo boat role had an armament layout of two twin .50 caliber Browning machine gun turrets, one located on the starboard side of the cockpit and one on the portside of the aft cabin, approximately located amidships. A single 20MM anti-aircraft cannon was mounted on the after deck. Four twenty-one inch diameter torpedoes, mounted in heavy steel tubes (identical to those mounted on the seventy-seven foot boats) were mounted two on either side of the boat.

Smoke generators were not mounted on the first twelve boats, but were mounted on every boat from PT-115 to 126 and became standard equipment on all Elco boats. This generator was mounted parallel to the centerline and was soon retrofitted to earlier boats. In 1942, the

PT-103 was the first of the new eighty foot class of PT Boats. Her keel was laid in January of 1942, but the boat was not actually launched until May. Due to an increase in weight, the eighty foot boats were slightly slower than the earlier Elco boats. (Naval Institute)



PT-140, an early production Elco eighty foot PT boat underway at high speed during a training exercise off Melville, Rhode Island. The boat is fitted with an SO radar dome on the tripod mast aft of the bridge. (National Archives)

three Packard engines installed in the boats had only 1,200 hp each, but because of the light-weight of the boats, top speeds in excess of forty knots were achieved.

So not to cause major interruptions with wartime production schedules, the length and hull designs of all of the boats were not changed. This does not mean that the manufacturers did not keep making improvements to their boats. The 1943 Elco eighty foot boat had the spray shields from around the engine room hatch removed. It also had the hatch redesigned, with the hatch being transformed from an entry/exit hatch into a large air intake.

After PT-325 the seven inch cowl ventilator was eliminated from the topside of the aft cabin, and two of the four cowl ventilators that were over the engine room were deleted as well. During 1943, surface search radar sets were beginning to be installed and different armament layouts were being experimented with. Installation of 37MM, 40MM and 75MM guns were tested. The 37MM and 40MM guns were proven to be excellent weapons for the role of attacking enemy landing barges, which was called "barge-busting" missions by the crews. The larger 75MM gun proved to be too heavy for the boats to carry.

An Elco invention called the "Thunderbolt" was also tested aboard four Elco boats, PT 556 to 559. The "Thunderbolt" was a power-driven gun mount that carried four 20MM cannon and, although it was proven to be a good weapon system, it was felt to be of limited usefulness and was not put into mass- production.

The lightweight Mark XIII torpedoes, along with their launching racks were beginning to appear on factory built boats and were being retrofitted to the boats already in the war zone. By this time, mid-1943 to late 1943, the boats were being utilized mainly in the gunboat role rather than as torpedo boats. During this period, the horsepower of the three Packard engines was increased from 1,200 hp to 1,350 hp. This increase enabled the boats to obtain a top speed of over forty-three knots. The aluminum gas tanks were improved by making them self-sealing.

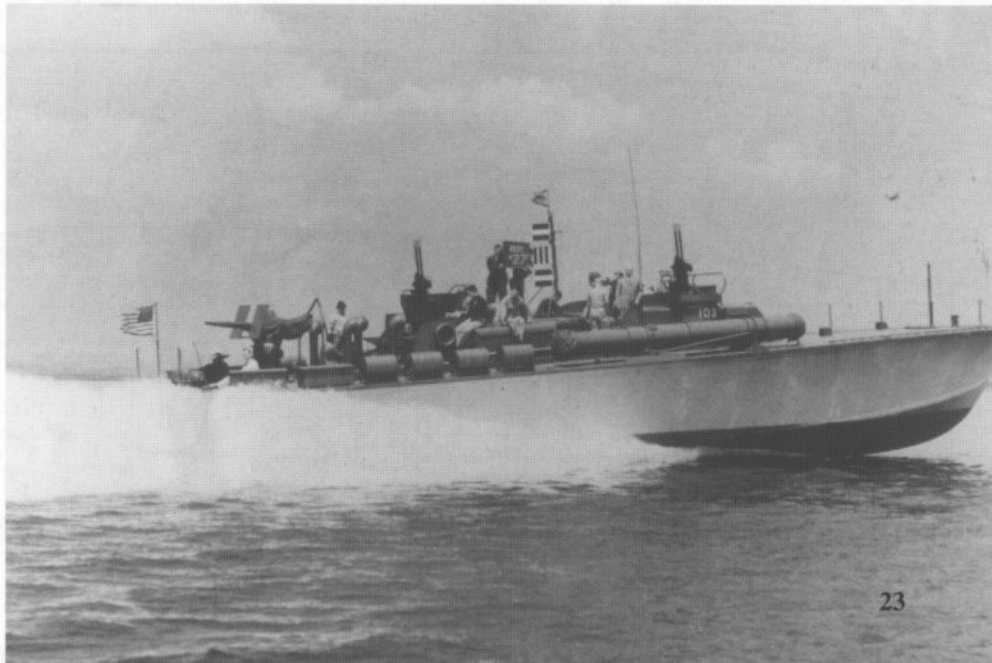
1944 was a year of major improvements on the eighty foot Elcos. The lightweight torpedo launching racks that were being field tested in mid-to late 1943 were now being factory installed on the new boats. Because of the weight savings gained by the removal of the steel torpedo tubes, the heavier 40MM cannon could now be installed on the stern where the 20mm cannon had been located on the later seventy-seven foot boats and the early eighty foot boats. Installation of the 40MM Bofors cannon by the factory began with PT 486 to 553.

The 20MM cannon was relocated to the portside of the bow. Also, the forward .50 caliber turret was moved back by three feet and given a slight forward tilt, this was done to give the gunner a better line of sight while firing, it also gave the person at the helm better vision from the cockpit. The after turret was also given the same forward tilt.

Due to the increased weight that was added from the additional armament and electronic equipment, the hull structure was strengthened, especially the forward area where the hull received the most pounding. The three engines again had their horsepower increased from 1,350hp to 1,500hp. In spite of the increased power, due to the additional military loads put on the boats, the top speed of the boats decreased to forty knots.

Additional experiments were carried out to try to improve the performance and armament of the boats. In early 1944, a few boats had barrage rocket projectors installed on each side of the forward deck. Elco increased the speed of the boats by fitting a series of six steps to the bottom and sides of a standard boat. In tests, this system enabled the boat to obtain a top speed of 55.95 knots, almost sixty-five miles per hour. The boat also gained more maneuver-ability, but its fuel and lube oil consumption increased and the acceleration dropped off too

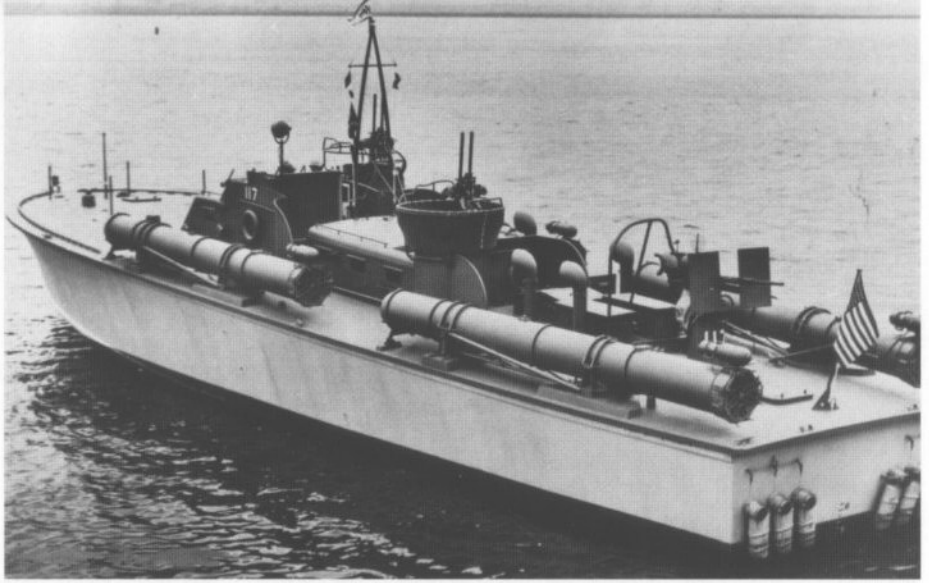
PT-103 runs at high speed during manufactures trials in June of 1942. The after torpedo tubes have been replaced with four depth charge racks. The man in the center is an Elco employee and he is holding a sign indicating that this is "Run 27". (Naval Historical Center)



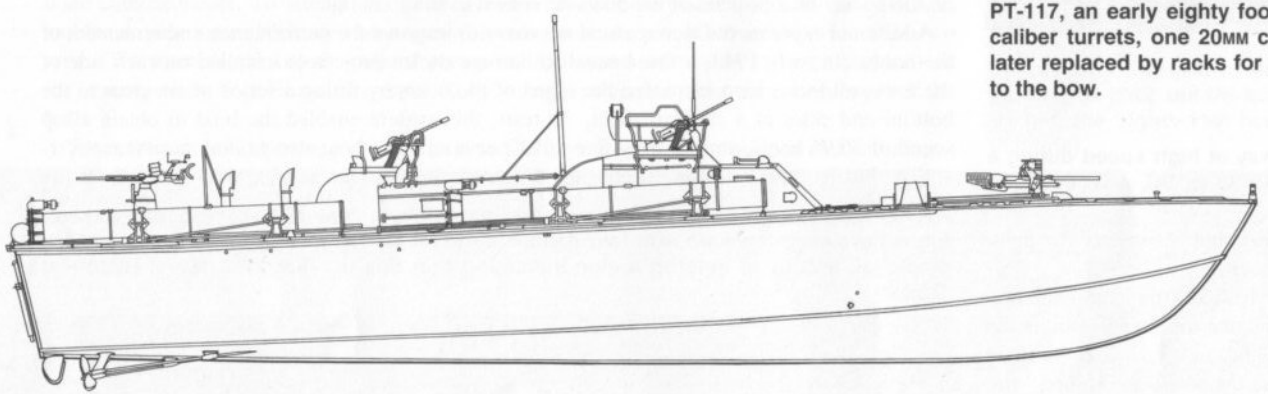
much to be cost effective and the experiment was terminated. The increase in armament, electronic equipment and increased horsepower were not the only improvements to the Elco boats, in 1944, the radar that was tested in 1943 became standard equipment.

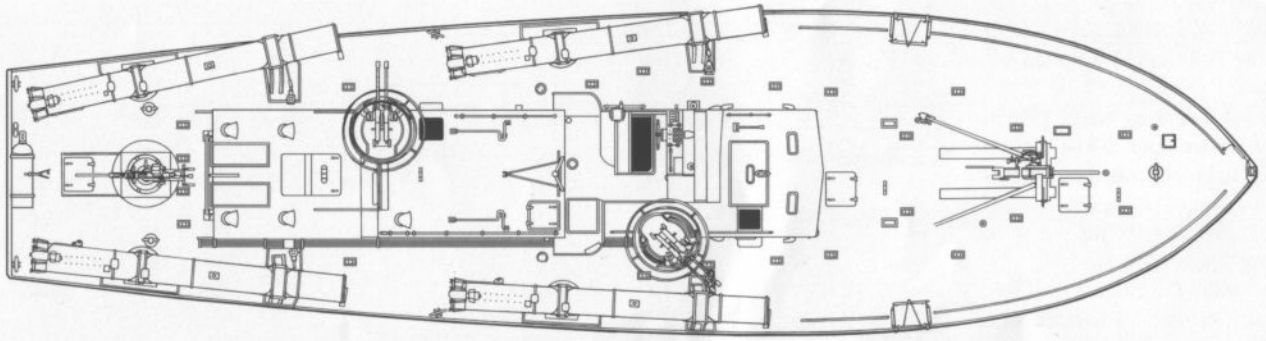
The 1945 Elco was the most powerful and heaviest armed Elco of the war. Additional armament was added to make the 1945 Elco one of the most heavily armed craft of their size. The rapid fire automatic 37MM cannon that was the main punch of the Army Air Corps P-39 Airacobra fighter was added to the already formidable armament of the late war PT boats. This hard hitting weapon was located on the forecastle, the boats also received launchers for five inch spin stabilized rockets. These were located just ahead of the forward torpedo racks.

The radar system was improved and some design changes in the cockpit were made. Elco redesigned the engine room and had the three engines drive the three propeller shafts directly, without the use of the V-drive system of propulsion. The after cabin which, on earlier eighty foot boats, was the day room, was used as a berthing area for additional crew on 1945 boats. This was done because a bulkhead was installed in the forward quarters to support the 37MM cannon.



PT-117, an early eighty foot Elco boat displays the factory armament fit of two twin .50 caliber turrets, one 20MM cannon on the stern and four torpedo tubes. The tubes were later replaced by racks for light weight Mk XIII torpedoes and a 37MM cannon was added to the bow.





Specification
Elco PT-103 Class

Length.....80 feet (24.4 m)
Beam.....23 feet(7 m)
Displacement.....38 tons (34,473 kg)

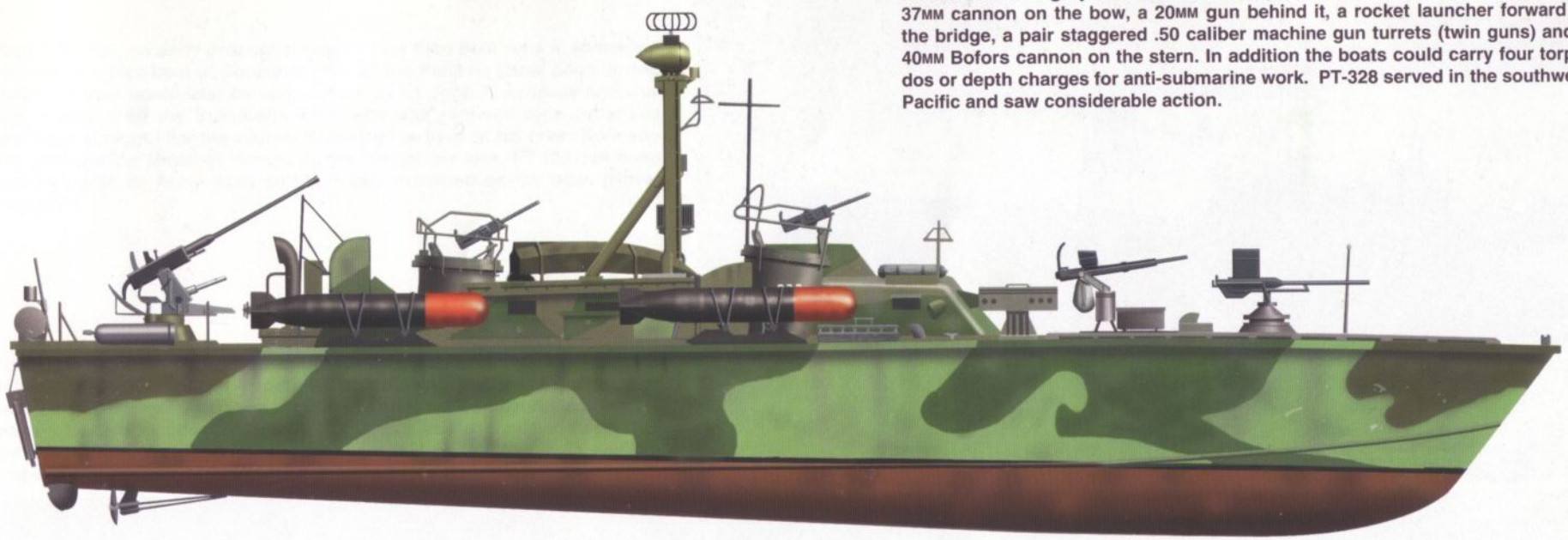
Powerplant.....Three 1,350 hp Packard liquid cooled engines
Armament.....Two twin .50 caliber machine gun turrets and four Mk XIII . torpedoes. One 20MM cannon on stern. Late boats carried a 37MM cannon on the bow.
Speed.....41-40 knots
Range.....550 miles (km)
Crew.....17

Torpedo Squadron 3

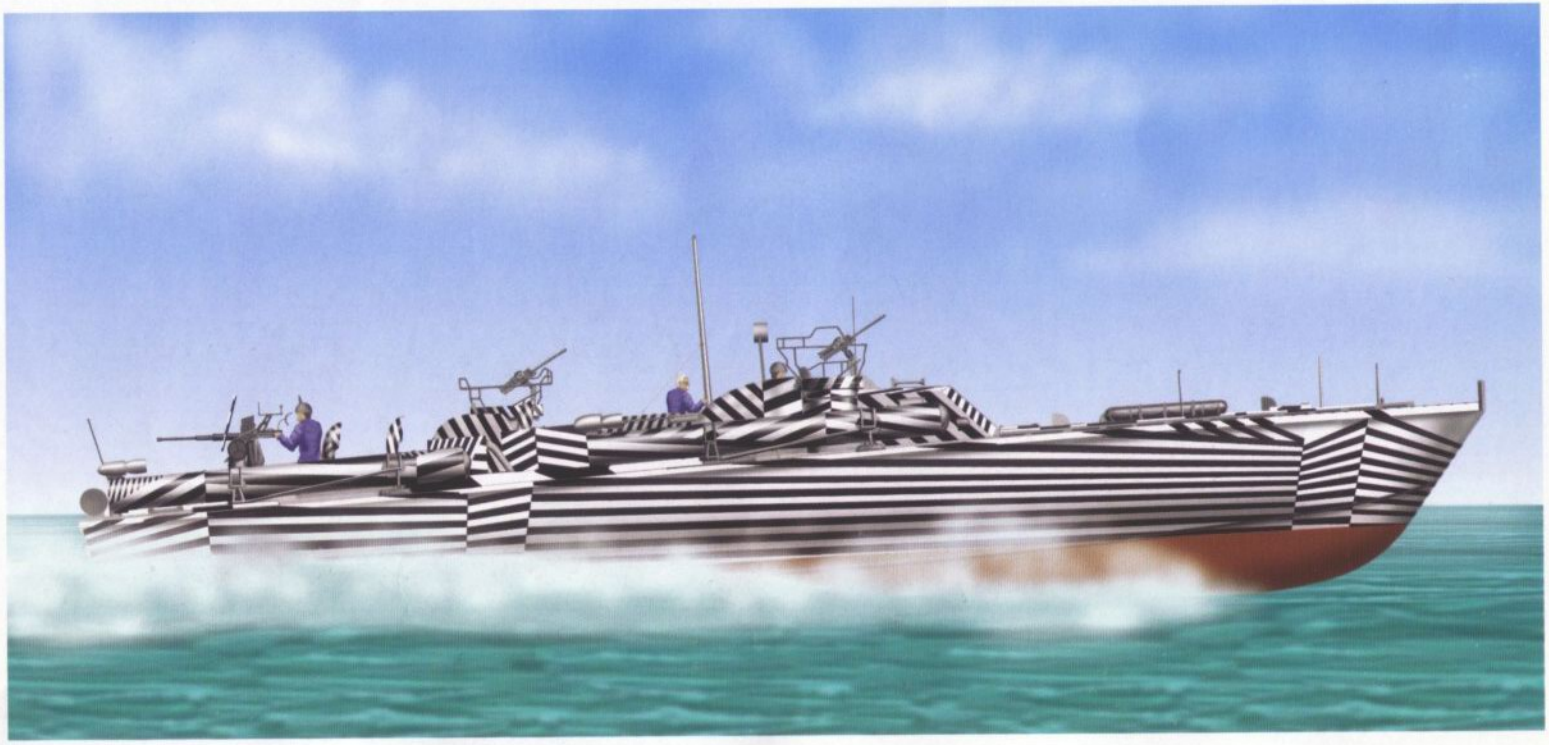
PT-31 was an early production seventy-seven foot Elco Patrol Torpedo (PT) boat assigned to Torpedo SquadronThree in the Phillippines during early 1942. The boat featured enclosed gun turrets housing twin .50 caliber machine guns.

PT-77, a seventy-eight foot Higgins Patrol Torpedo (PT) boat during a high speed run while on training maneuvers off the Panama Canal Zone during 1943. The boat was later lost to "friendly fire" during 1945. The Higgins boat featured twin .50 caliber machine gun turrets on either side of the bridge and a 20MM cannon on the stern. The torpedo tubes on this series of boat were mounted in a staggered postion.

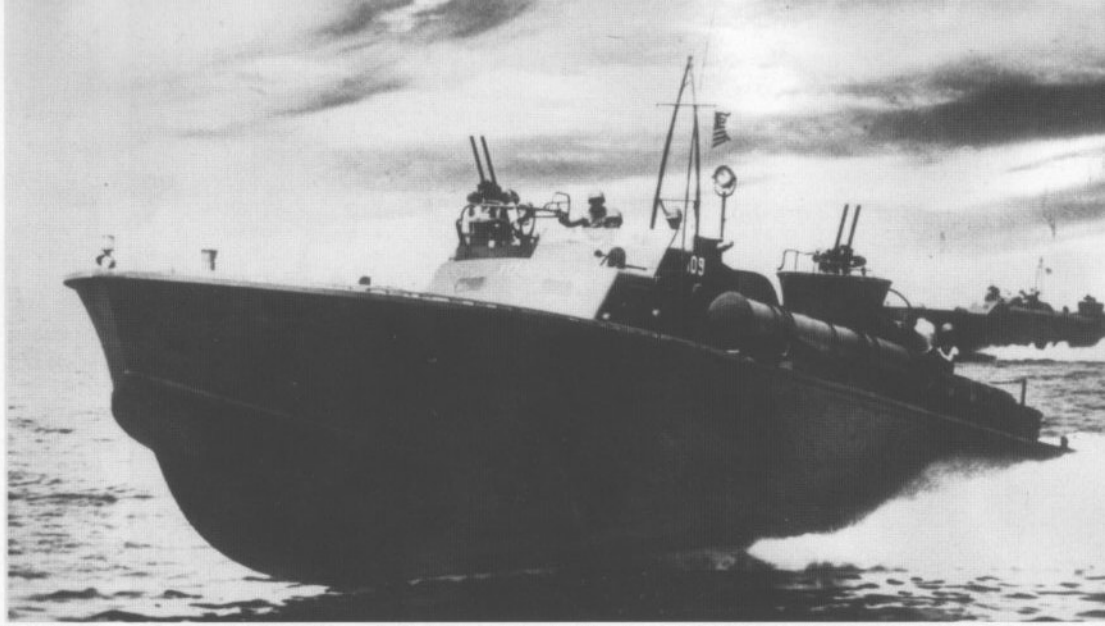
PT-328 was an eighty foot Elco Patrol Torpedo (PT) boat that was armed with a 37MM cannon on the bow, a 20MM gun behind it, a rocket launcher forward of the bridge, a pair staggered .50 caliber machine gun turrets (twin guns) and a 40MM Bofors cannon on the stern. In addition the boats could carry four torpedos or depth charges for anti-submarine work. PT-328 served in the southwest Pacific and saw considerable action.



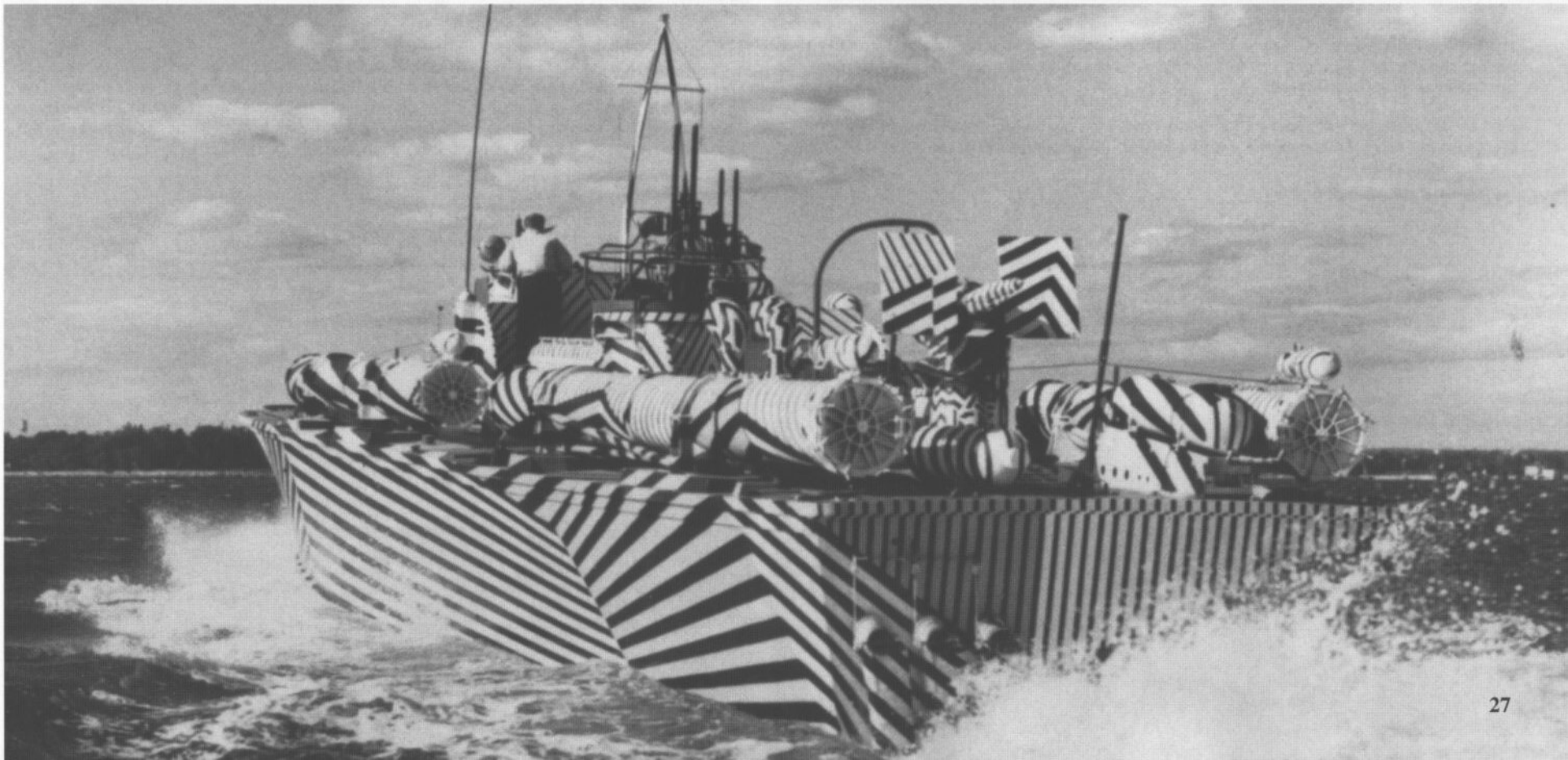
This eighty foot Elco Patrol Torpedo (PT) boat was experimentally painted with a Black and White "Zębra" scheme designed to confuse the enemy as to the type of vessel and direction of travel. This type of scheme was used experimentally in both the Mediterrean and Pacific with limited success. The difficulty in painting and maintaining the camouflage led to its being abandoned.

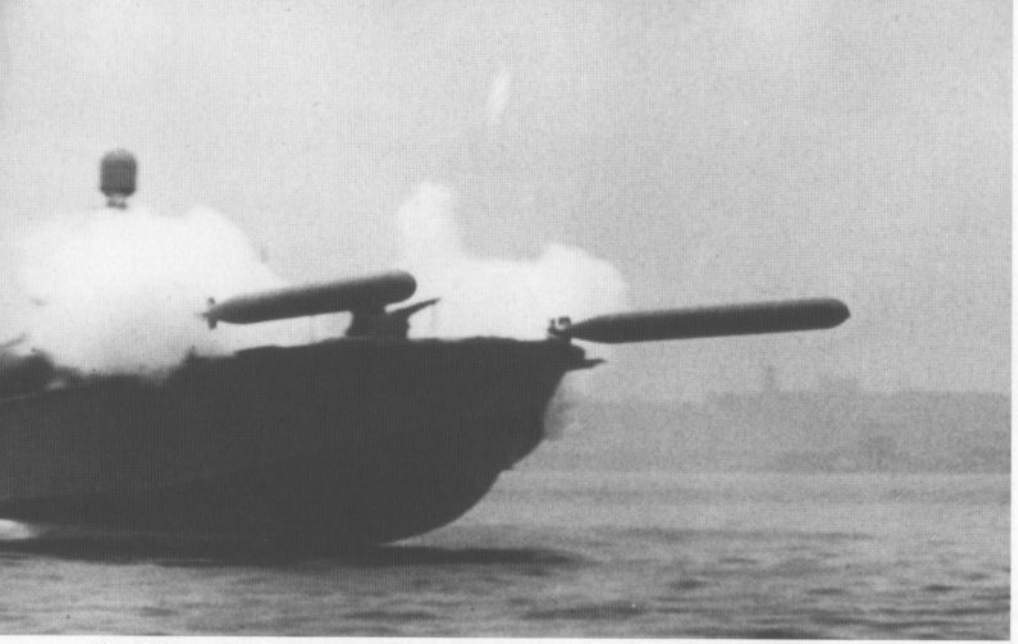


(Right) PT-109, an early production eighty foot Elco boat runs in formation with another Elco boat of Squadron Five off the Panama Canal Zone during 1942. The boat would later be commanded by LT John F. Kennedy and was lost in action off the Solomons when she was rammed by a Japanese destroyer at night. For his actions in saving the lives of his crew, Kennedy was awarded the Medal of Honor. At the time of her loss, PT-109 had been modified with an Army 37MM anti-tank gun mounted on the bow. (Naval Institute)



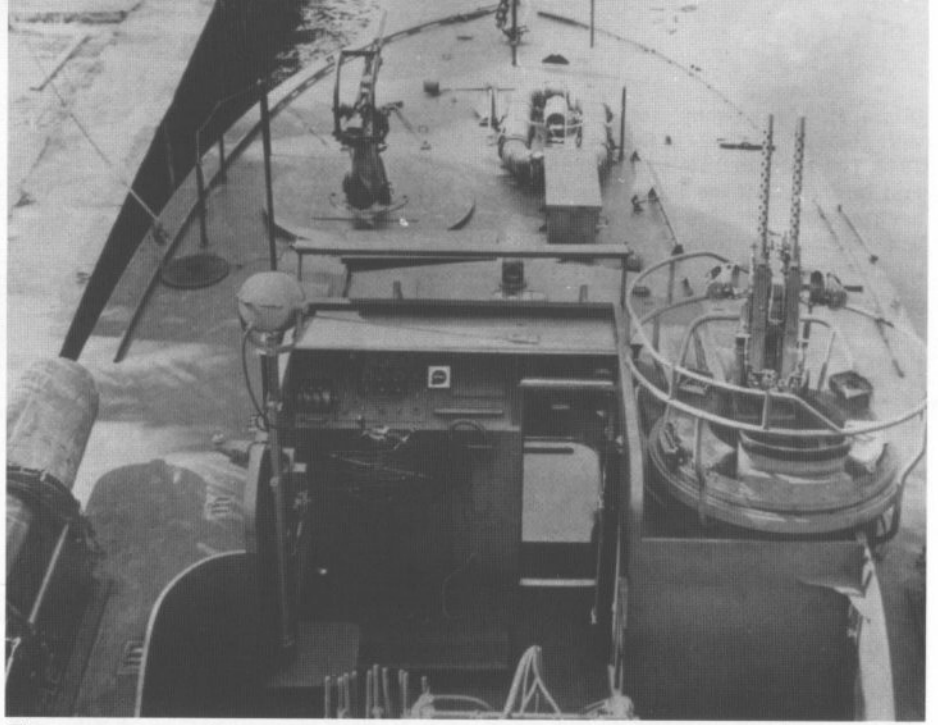
This eighty foot Elco boat carries an experimental Zebra stripe camouflage scheme that was tried out in both the Pacific and Mediterrean areas. The scheme was designed to make accurate ranging of the boat difficult and to make it hard for spotters to determine the direction of travel and speed of the boat. The scheme met with some success, but its difficulty in application and maintenance led to it being phase out. (PT Boaters, Inc.)





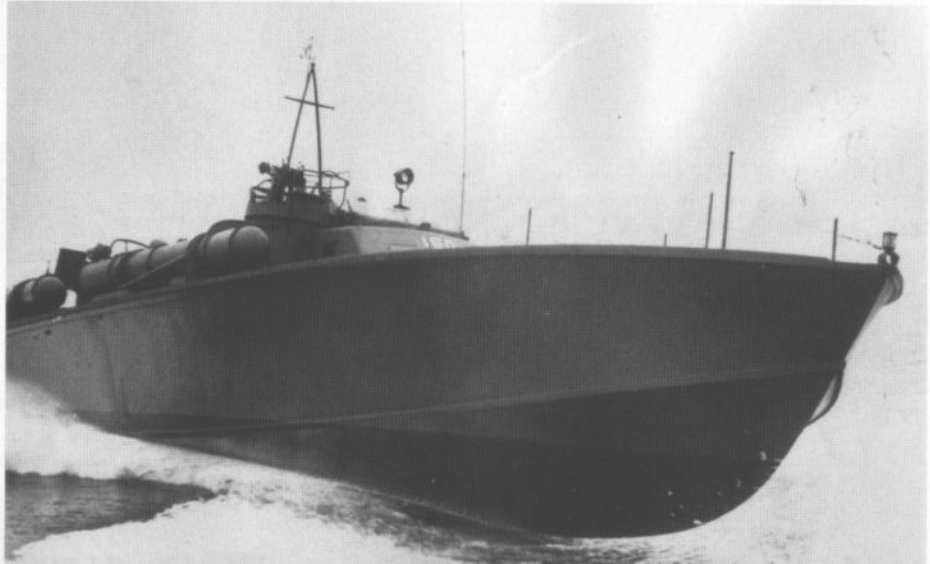
An mid-war Elco eighty foot PT Boat launches a pair of Mk VIII torpedoes during a training exercise off Newport, Rhode Island during 1943. The smoke comes from the propelling charge that expelled the torpedoes from the tube with enough force to clear the boat. (Naval Historical Center)

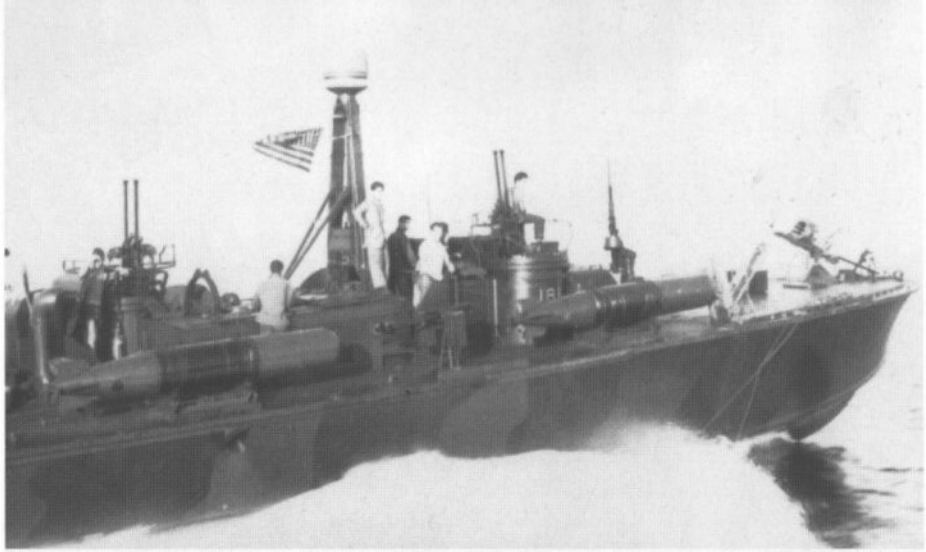
PT-141 was outfitted with four depth charge racks on each side of the boat in place of the after torpedo tube. This armament change was not uncommon for boats in U.S. waters. (Naval Institute)



The armament carried on the eighty foot PT Boats was as varied as their crews. The crew of this boat have added a 20MM cannon on an anti-aircraft mount on the bow. Additionally, the torpedo tubes have been replaced with light weight racks and Mk XIII torpedoes (Al Ross, Coastal Forces, Inc.)

PT-160 displays the typical factory installed armament configuration for the period mid-1942 to early 1943. The standard weapons included two twin .50 caliber machine gun mounts, a 20MM mount on the stern and four torpedo tubes for Mk VII or VIII torpedoes. (Naval Institute)

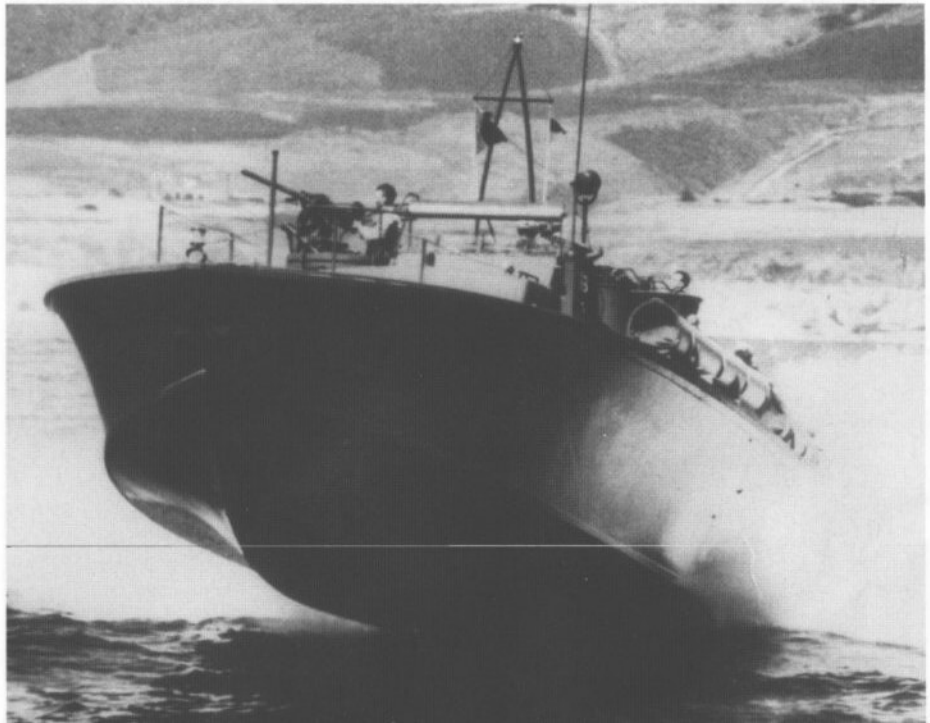




(Top & Right) PT-188 reveals some of the late war armament modifications made to eighty foot Elco boats in the field. She carries Mk XIII torpedoes on light weight racks, a 37MM automatic cannon on the forecastle, a 20MM cannon on an anti-aircraft mount in front of the bridge, the standard two twin .50 caliber machine gun turrets, another cannon on the stern and what appears to be a rocket launcher just forward of the front Mk XIII torpedo. The boat is also outfitted with a SO type radar dome on top of the tripod mast. (PT Boaters, Inc.)

PT-330 displays yet another armament configuration. She mounts a 37MM cannon on the forecastle, a 20MM cannon forward of the bridge, a 40MM Bofors on the stern, a depth charge rack forward of the front MK XIII torpedo and at least one extra .50 caliber machine gun on a pipe mount on the port side. (Naval Institute)

PT-363 runs "on the step". When running in an attack mode, at high speeds, the PT boat would plain across the water with as much as one third of its length completely clear of the water, (Naval Institute)



The electronics mounted on PT-588 included a streamlined radar dome, a second radar antenna above it, a direction finder antenna, an IFF antenna and several radio antennas. (PT Boaters, Inc.)

PT 588 was built in 1945 and represents one of the last factory installed armament configurations. She carries an automatic 37MM rapid fire cannon on the bow along with a 20MM cannon on an anti-aircraft mounting. On either side of the boat, just forward of the bridge are eight shot rocket launchers for five inch rockets. In addition, she carries the standard .50 caliber machine gun turrets, a 40MM Bofors on the stern and light weight racks for Mk XIII torpedoes. (Naval Institute)

Armament

All boats left the factories with a standard armament package that, as the war went on, was continuously being upgraded and modified. These modifications took advantage of new technology as well as data that came in from the war zones. These modifications, made by the factories, were not the only alterations made to the boat's armament layouts. A boat's armament was often heavily modified by their crews in the combat areas as the situation warranted. These modifications were effected because it proved very easy to make alterations to a small wooden boat in the field.

Modifications were more frequent when the boats were being used in the Guadalcanal campaign, when the boats were being transformed from torpedo boats to gunboats and "barge-busters". A large number of seventy-seven foot Elco boats were converted to the gunboat role with a wide variety of guns and gun mounts. From late 1942 until mid-1943, the standard armament of all PT boats was as follows:

Four Mark VIII torpedoes carried in heavy welded steel tubes, two tubes on each side of the deck. Four .50 caliber Browning machine guns set in twin gun mounts. A single 20MM Oerlikon M-4 gun on a Mark 4 hand elevated mount.

The early mark XIV torpedoes had a diameter of 21.060 inches, was hundred forty inches long and weighed two thousand seventeen pounds. An alternative to the Mark XIV was the Mark VIII, this torpedo was ten inches longer and weighed two thousand twenty pounds.

The crew could fire the torpedoes in one of two ways. They could be fired electrically from the cockpit by the commanding officer, or the torpedoman could fire them by striking the firing mechanism with a mallet. Both Marks of torpedo were of First World War vintage and

A standard eighty foot Elco PT Boat (left) goes on patrol with PT-61, a seventy-seven foot Elco that was converted to the gunboat role during 1943. She carries 40MM Bofors mounts on the bow and stern along with numerous machine gun mounts. (PT Boaters, Inc.)

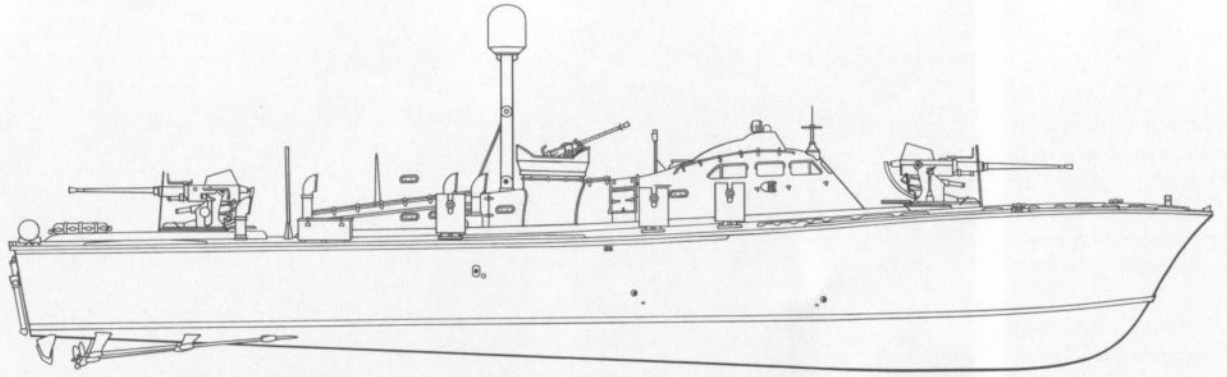
The armament carried on PT Boats was only limited by the ability of the crew to procure and install the weapons. This Elco eighty-foot boat was stationed in the Philippines and the crew have gone out of their way to out fit her with extra firepower. She carries Mk XIII torpedoes, a 20MM cannon on the bow, another just behind the port Mk XIII, twin .50 caliber machine gun mounts on the bow and on the starboard side just behind the Mk XIII, a single .50 caliber machine gun on the bridge wing, "hedge hog" anti-submarine rocket launchers and a mortar on the bridge. (National Archives)

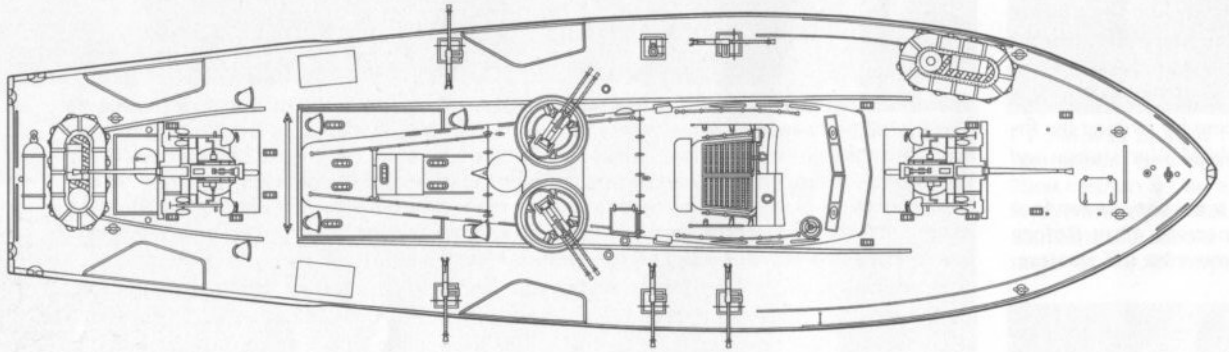
were originally designed for use on destroyers. The torpedoes had an extremely long range, ten thousand yards and their speed was a slow twenty seven knots. They were launched from heavy welded steel tubes and a firing charge was used in the tubes on board the Elco classes and Huckins boats, while the Higgins boats used compressed air. The compressed air system was better because it would not give the location of the boat away during a night attack.

The early torpedoes were dismal failures at best. Sixty-three percent of them were found to be defective. The torpedoes would only detonate if they hit their target at an angle. Running was consistently deeper than the depth at which they were set, often ten to fifteen feet deeper. The "fish". as they were called, would also make erratic runs and some of them would even circle around toward the PT boat.

The torpedoes were fired from their tubes at a velocity of forty feet per second and cleared the boat's deck by a margin of five and a half feet; Grease was packed in around the head of the torpedo and the muzzle of the tube to prevent water from getting into the tube.

The two twin .50 caliber Browning machine guns were set in turrets that were open, manually operated ring type mounts. Ammunition for the guns was fed by belts from curved boxes inside the turrets. The guns could be elevated to an angle of eighty degrees and depressed to an angle of five degrees. Guard rails were installed to prevent the gunners from accidentally firing into any part of the boat. Training of the guns was done by the gunner when he pushed back on a backrest in the turret. The air cooled Browning .50 caliber machine gun was fifty six inches long and weighed sixty-eight pounds. It was primarily an anti-personnel weapon





Specification
Elco PT 59 Gunboat Conversion

Length.....77 feet (23.5 m)
Beam.....19 feet 11 inches (6 m)
Displacement.....33 tons (29,937 kg)

Powerplant.....Three 1,200 hp Packard liquid cooled engines
Armament.....Two twin .50 caliber machine gun turrets. Two 40MM Bofors cannon Provision for multiple .50 caliber machine guns mounted on either side of the boat
Speed.....39 knots
Range.....550 miles (km)
Crew.....20 Plus

with a firing rate of six hundred rounds per minute. Its short range and the non-explosive rounds limited its usefulness to soft targets.

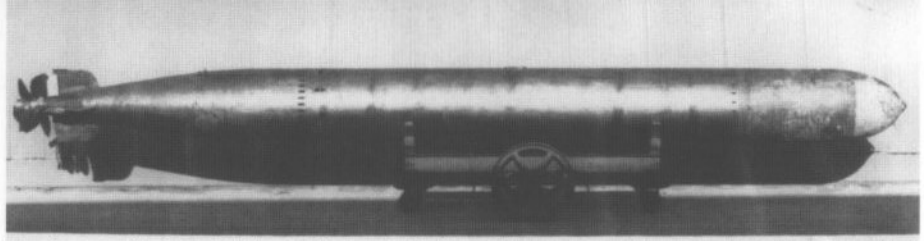
The Oerlikon 20MM cannon was used primarily in the anti-aircraft role. It was a close range, high angle gun that had a six thousand feet ceiling and a range of five thousand five hundred yards. It had a firing rate of four hundred fifty rounds per minute, firing explosive, armor piercing and tracer rounds. The ammunition was housed in a magazine which contained sixty rounds. Having good range and high rate of fire made the Oerlikon very effective against dive bombers.

By mid-1943, another weapon was added to the PT boat's armament layout. This was the rapid firing automatic 37MM cannon, which had originally been installed in the Army Air Corps' P-39 Airacobra fighter. It was field tested against enemy shore positions and the results were good enough for it to be adopted for standard use.

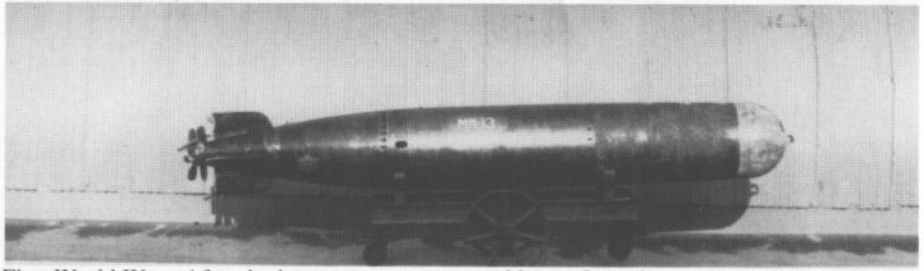
The 37MM cannon had a rate of fire of one hundred twenty rounds per minute, a range of eight thousand eight hundred seventy-five yards and a ceiling of six thousand two hundred feet. It was usually located in the center of the foredeck. Until 1945, when a specialized mounting was designed for it, the gun was mounted on a 20MM cannon tripod mount.

Also introduced in mid-1943 was the Bofors 40MM cannon and this weapon was soon adopted for wide spread use on PT boats. The boats were being utilized in anti-landing craft operations (barge-busting) rather than anti-shipping torpedo operations and it was found that the boats were going to be needing a more powerful gun than the 20MM Oerlikon. Despite its being extremely heavy, the Bofors gun was the most powerful and most accurate anti-landing barge weapon at that time. It had a range of five thousand four hundred twenty yards and a ceiling of two thousand feet. The rate of fire was one hundred thirty rounds per minute and it could fire a variety of rounds including high explosive, armor piercing and tracer rounds. Four men were needed to operate the gun which was placed on the stern, where the 20mm Oerlikon had been located. The 20MM cannon was then relocated to the forecastle usually behind the 37MM cannon. The 40MM Bofors was installed only after the weight of the four heavy welded steel torpedo tubes was removed, when they were replaced by lightweight torpedo racks.

The light weight torpedo rack was the idea of a few-officers who were in a New York City bar discussing an idea for a new method of launching a torpedo from a PT boat. In the early years of the war PT boats had to use a slow, unreliable torpedo that was left over from the

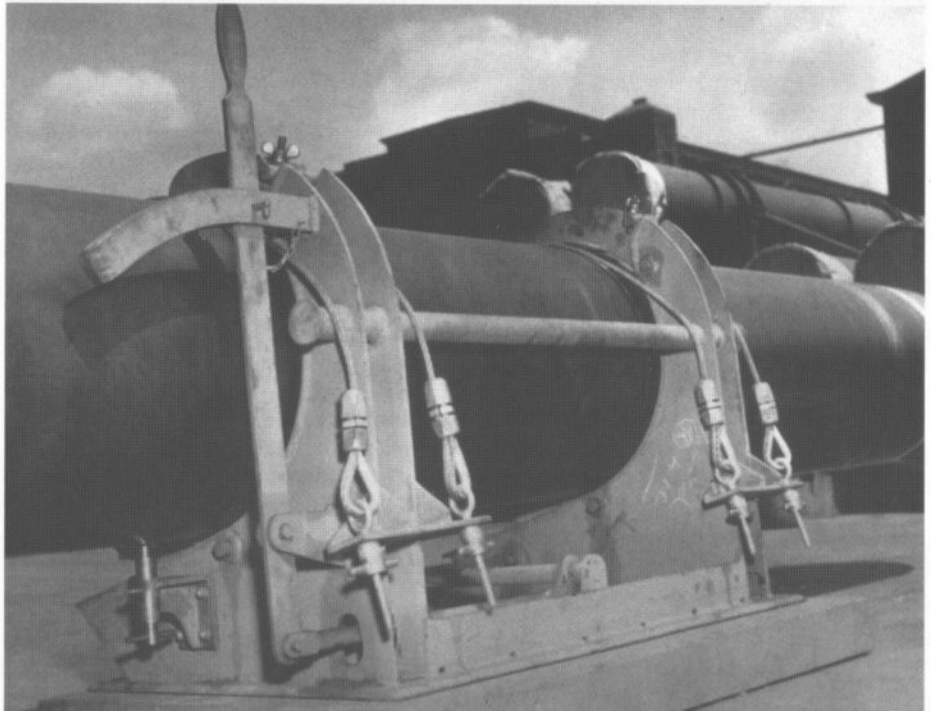


The two main types of torpedoes carried on American PT Boats were the Mk VII/VIII (above) and the Mk XIII (below). The Mk VII/VIII weighed 2,117 pounds and the Mk XIII weighed 2,000 pounds. The Mk XIII was a drastic improvement over the earlier weapon and was the same torpedo carried aboard the TBF Avenger torpedo bomber. (Naval Historical Center)



First World War. After the boat crews were rotated home from the war zone, it was apparent from their reports that the boats needed a torpedo that was reliable and faster than the ones that they had gone to war with.

This launching rack was thought up by two officers over drinks in New York. The light weight rack allowed the torpedoes to be rolled off the deck, instead of being launched from tubes, which often would set off a flash from the charge and then spread grease, which often would give away the position of the attacking boat. (PT Boaters, Inc.)

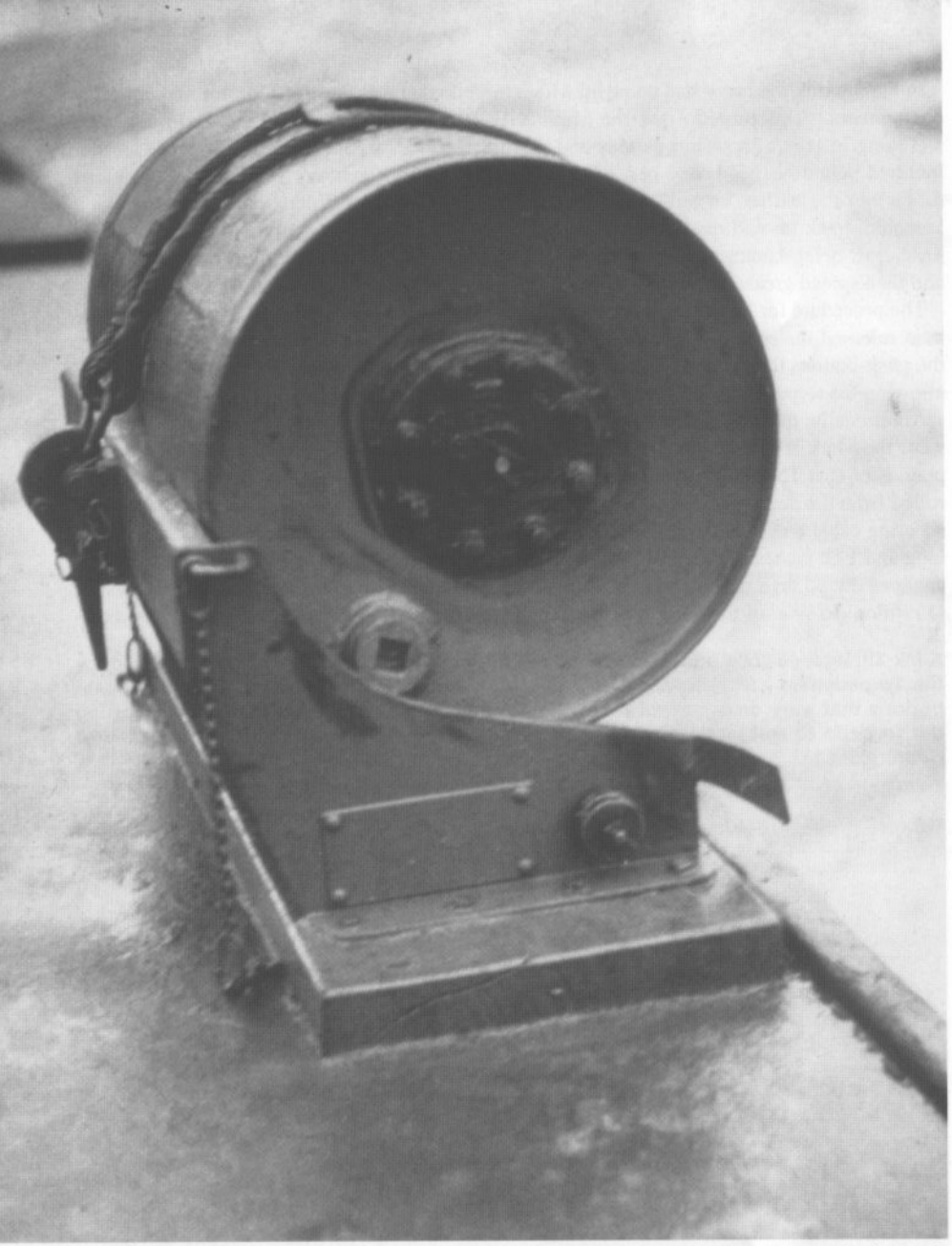


In the interim, the Navy had come up with a torpedo that was designed for use in their torpedo bombers. This torpedo was the Mark XIII, it was still twenty-one inches in diameter, weighing in at two thousand pounds and was thirteen feet six inches long. It carried a four hundred pound warhead and best of all, it did not require the heavy welded steel launching tubes that the earlier torpedoes required. The idea that the officers came up with was a launching rack instead of a tube. This rack allowed the torpedoes to be rolled off the deck, instead of being launched from the tubes, which often would set off a flash from the charge and then spread grease, which often would give away the position of the attacking boat.

The procedure for launching a torpedo from the rack was uncomplicated. After the torpedoman released the securing cables, the torpedo was launched electrically from the cockpit by the push-buttons that were on a control panel. These buttons lowered the restraining supports, allowing the torpedo to roll into the water beside the boat with its propellers spinning.

Additionally, most of the boats carried from two to four depth charges. These depth charges were the Mark VI depth charge. It weighed four hundred twenty pounds, with three hundred pounds of cast TNT in a rolled steel case. Like the newer torpedoes, the depth charges were rolled from the deck from a light weight metal rack by releasing a hook which was linked to a securing cable that held the charge. The measurements of the depth charges were 27.6 inches long and 17.6 inches in diameter. The boats never were the best launching platforms for depth charges, due to their narrow and hard chined hulls that tended to rock in all but the calmest of sea states. In spite of this fact, the crews found out that the depth charges were very effective

A Mk XIII torpedo rolls off the side of an eighty-foot Elco PT Boat after being released by the Torpedoman. The torpedo was launched electrically from the cockpit by the push-buttons that were on a control panel. These lowered the restraining supports, allowing the torpedo to roll into the water beside the boat with its propellers spinning. (PT Boaters, Inc.)



A Type C 300 pound depth charge on a roll off rack. Some PT Boats carried depth charges, not for anti-submarine work, but to dissuade enemy destroyers from giving chase. This was accomplished by dropping a depth charge in the path of the on-coming vessel and setting the depth charge at a shallow depth. (PT Boaters, Inc.)

The Browning .M2 50 caliber air cooled machine gun was a widely used weapon on all PT Boats. This Higgins seventy-eight foot boat has two twin .50 turrets and additional .50 caliber mounts, both single and twin mounted around the bridge. The boat operated in the Mediterrean and was later turned over to the Royal Navy. (Naval Historical Center)

against an enemy Destroyer and were used to dissuade a chase. This was accomplished by dropping a depth charge in the path of the on-coming vessel and setting the depth charge at a shallow depth.

During the last year of the war, the armament of the boats were increased by the addition of two rocket launchers and a mortar. These additions were located forward of the torpedoes. The rocket launchers held 4.5 inch barrage rockets, with the same power as the five inch shells of a Destroyer. Unfortunately, these rockets came too late in the war to be fully tested in action.

The mortar; however, proved to be a very effective weapon. It could be used against landing barges, shore positions or to illuminate a target. Although the next item was not truly a weapon, it was still a very important piece of equipment. The smoke generator, installed on all operational United States Navy PT boats, could be used to cover the boats' retreat, to cover amphibious landings or to hide another damaged boat. Every boat carried a non-refillable steel bottle. This bottle rested on wooden blocks on the stern and was secured to the deck by two steel straps. The "smoke" (titanium tetrachloride) was expelled into the air from a pipe with a

The belted ammunition for the .50 caliber machine guns was loaded into ammunition boxes and fed into each gun across a curved fed system designed to prevent jamming. (PT Boaters, Inc.)

The inside of one of the two .50 caliber machine gun turrets aboard an eighty foot Elco PT boat reveals the two canvas cover ammunition boxes on either side of the guns, empty brass collection tube and bags. The curved panel is the gunner's backrest. (PT Boaters, Inc.)

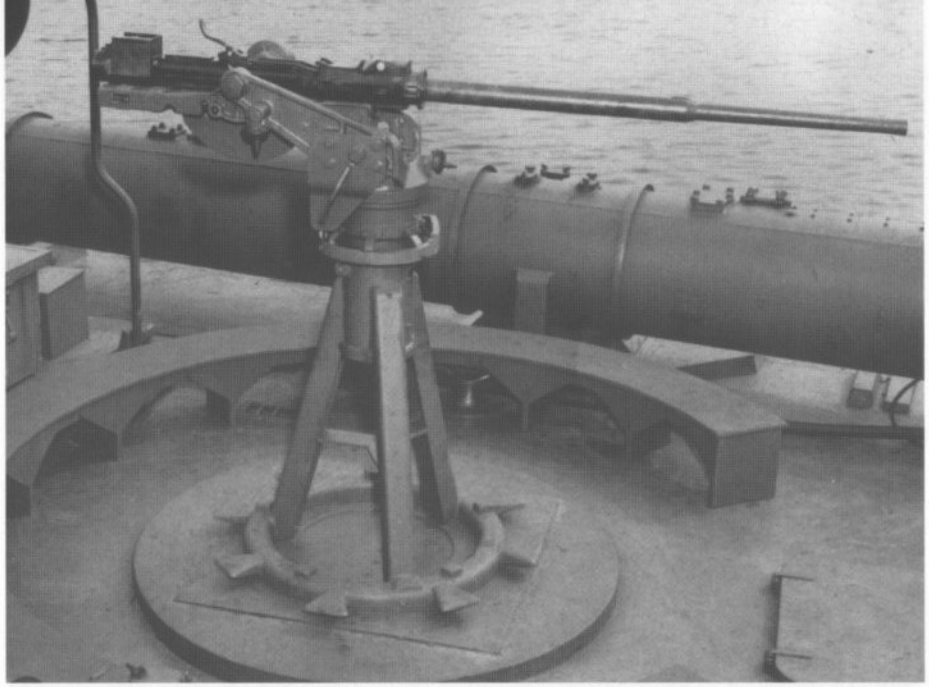
nozzle that rose two feet from the bottle. The titanium tetrachloride produced a thick, dense fog cloud that the boat could use as a cover during an attack, or as stated before, during a retreat after the attack. The chemical did have one drawback, this drawback was that the chemical reaction produced caustic hydrochloric acid. Because of this, the crew had to use great care in activating the smoke and after each use, the deck had to be thoroughly washed down.

Radar was not a weapon, but it, like the smoke generator, became vital to the survivability of the boats. A few of the boats in the Solomon campaign had a crude installation of an aircraft type of radar (the SO and SO-3) system, although it was somewhat unreliable, the potential of having radar on the boats was realized and a radar system for the boats was designed by 1943.

Radar was especially useful in the Mediterranean where the boats there utilized radar to conduct torpedo attacks by using radar bearings alone. The standard armament package, as well as the upgraded armament packages throughout the war, were continually being altered by the crews by their installing additional .50 caliber and 20MM guns, or .30 caliber guns whenever and wherever they could find them.

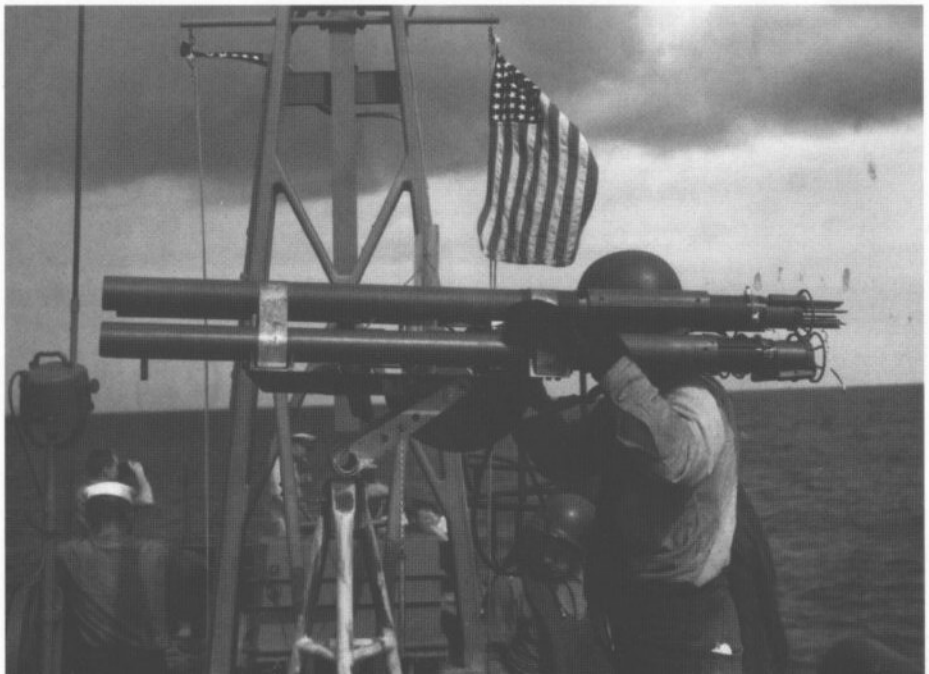
(Left) The Oerlikon Mk 4 20MM cannon was used primarily in the anti-aircraft role. It was a close range, high angle gun with a six thousand feet ceiling, a range of five thousand five hundred yards, and a firing rate of four hundred fifty rounds per minute, firing explosive, armor piercing and tracer rounds. The ammunition was housed in a round magazine which contained sixty rounds. (PT Boaters, Inc.)

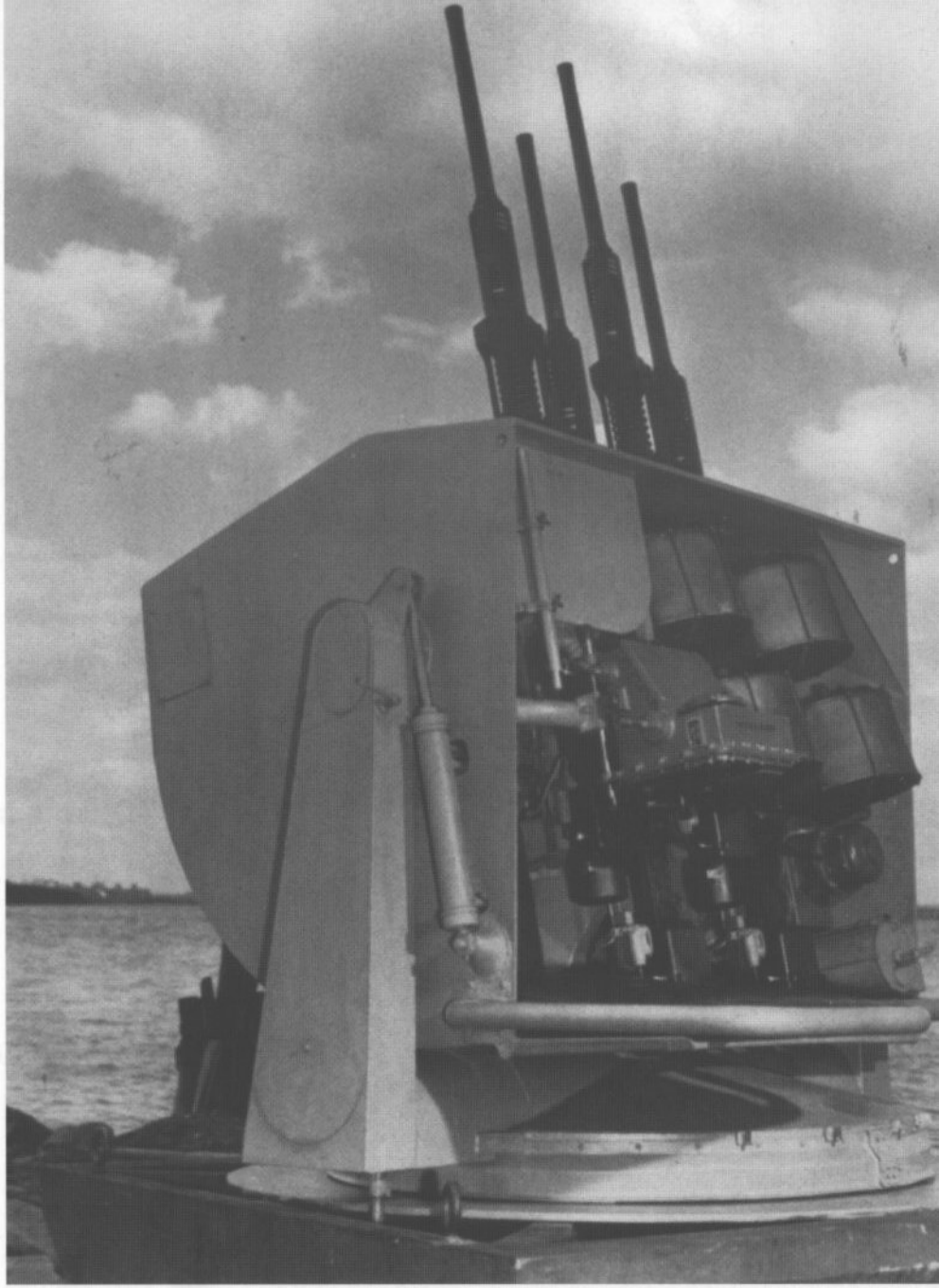
The smoke generator, installed on all operational United States Navy PT boats, could be used to cover the boats' retreat, to cover amphibious landings or to hide a damaged boat. Every boat carried a non-refillable steel bottle mounted on the stern which was secured to the deck by two steel straps. (PT Boaters, Inc.)



This 20MM Mk 4 cannon was mounted on a light weight tripod mount which was a great improvement over earlier mounts. It both saved weight and required less space to mount. (PT Boaters, Inc.)

A crewman mans a 3.5inch rocket launcher mounting on an eighty foot Elco boat. This mount consisted of six 3.5in Bazookas mounted in groups of three on either side of the gunner. It was not used operationally. (National Archives)





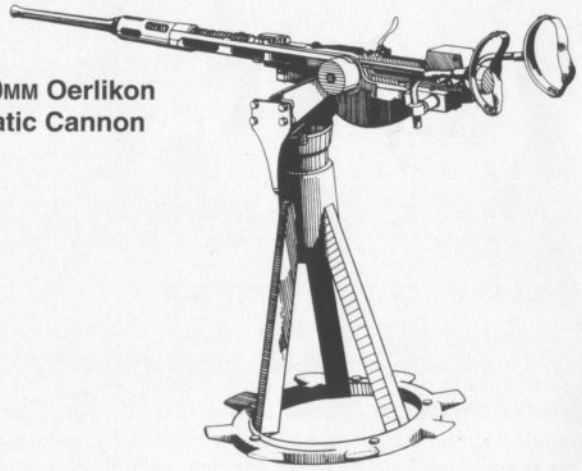
The Elco designed Thunderbolt system consisted of four Mk 4 20MM cannons mounted in a power driven turret. The system worked, but it did not find favor. Crews preferred the heavier weight of fire from the 40MM Bofors cannon instead. (PT Boaters, Inc.)

Field installation of an automatic 37MM cannon taken from a P-39 Airacobra fighter. This cannon was later standardized and factory mount was designed and used on late eighty foot Elco boats. (PT Boaters, Inc.)

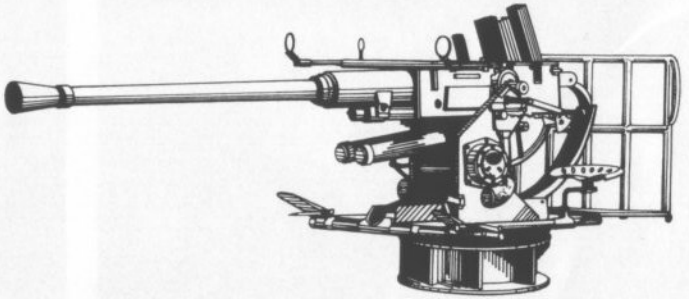
Another field adaptation of a 37MM automatic cannon salvaged from an Army Air Corps Bell P-39 fighter. This type of gun was highly prized by crews for use against Japanese barges.

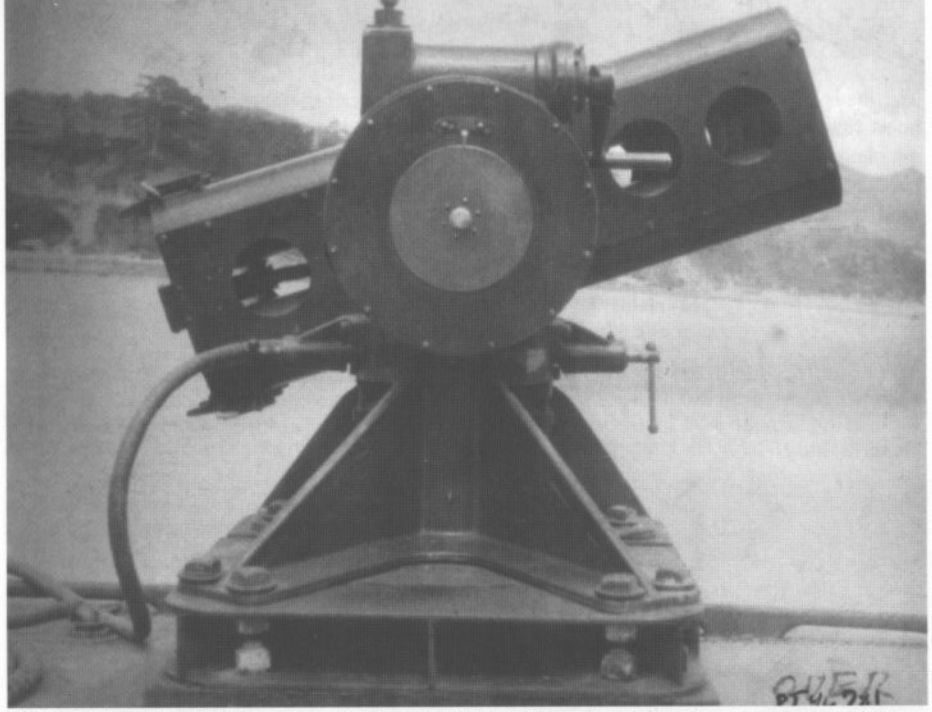
Main Types of Cannons Carried on PT Boats

Mk 4 20MM Oerlikon Automatic Cannon



40MM Bofors Anti-aircraft/anti-shipping cannon





The eight shot rocket launcher fired 5 inch fin stabilized rockets. Most boats carried two such launchers giving the PT Boat the same firepower as a destroyer. (PT Boaters, Inc.)

(Right) The 40MM mount was not only fitted to Elco boats, but was also carried on late war seventy-eight foot Higgins boats . This boat also mounts a 20MM cannon just forward of the Bofors mount. (PT Boaters, Inc.)

The Bofors 40MM cannon was manned by a crew of three; gunner, trainer and loader. The gun became a standard feature on PT Boats after 1943. (PT Boaters, Inc.)

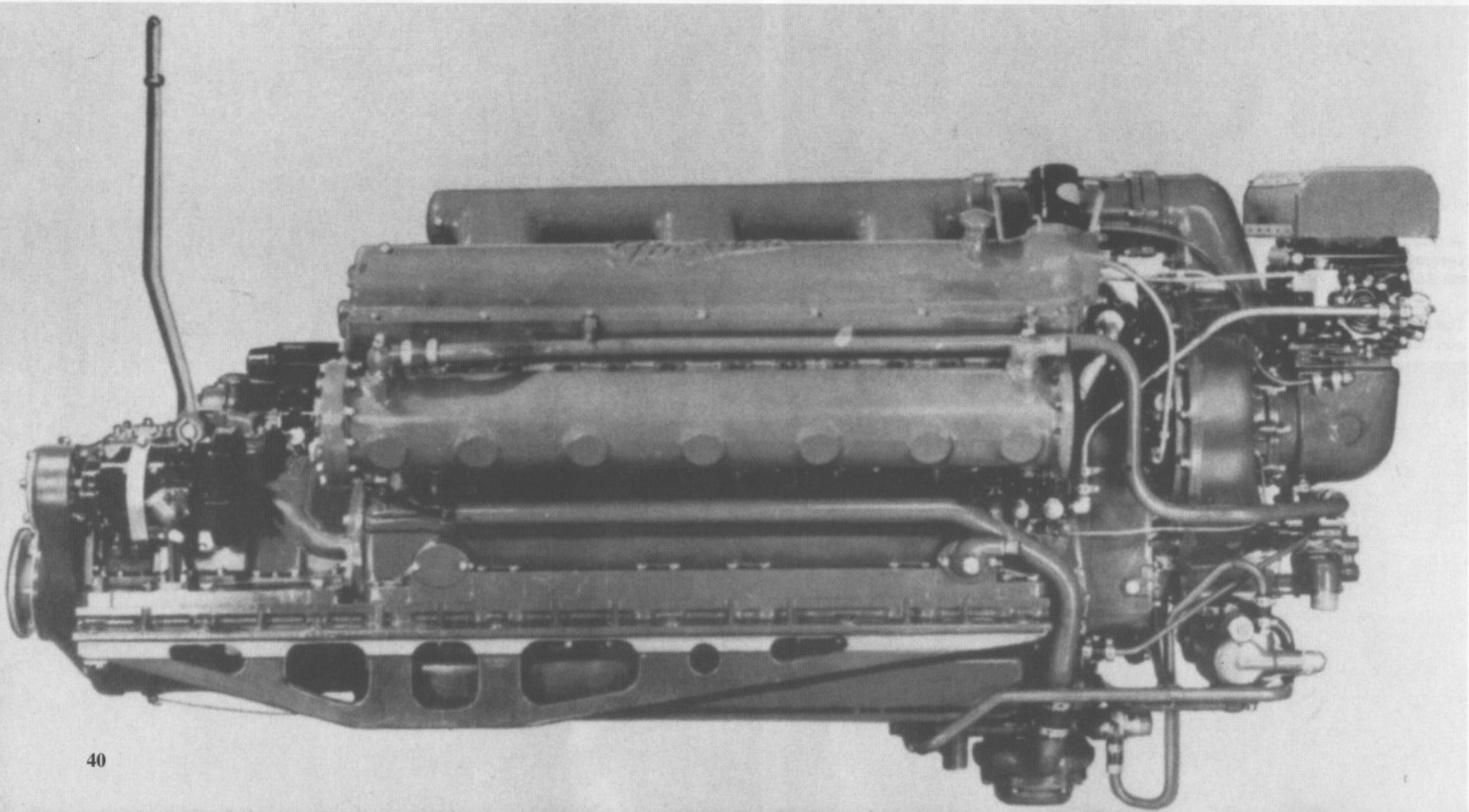
Engines

Between the two world wars, the Packard Engine Company, built the engines that powered the racing boats of Gar Wood; boats such as Wood's Miss America series of racers. This relationship spawned the source of powerplants for all operational PT boats in the United States Navy during the Second World War.

Packard built a twelve cylinder engine, the Packard Marine Engine 4M-2500, that was an outgrowth of the seven hundred fifty horsepower Liberty aircraft engine. It was a very dependable light weight engine that produced twelve hundred horsepower in its early production versions. During the war years; however, the engine's output was increased to thirteen hundred fifty horsepower and at war's end, the power output was fifteen hundred horsepower.

These power increases were a result of the ever increasing war-loads carried by the boats. The loads offset the power increases so much that the performance of the mid and late war boats remained the same as the earlier boats. The engine weighed in at only two thousand nine hundred fifty pounds, and cruising at twenty-four hundred rpms, the boats consumed four hundred seventy four gallons of one hundred octane gasoline. Throttled down to two-thousand rpms, the engines burned two hundred ninety two gallons, which enabled the boat to have an operating radius of two hundred fifty nine miles at a speed of thirty-five knots.

The liquid cooled 1,200 hp Packard 4M-25 00 was the standard powerplant of all U.S. Navy PT boats until the mid-point of the war. Later variants of this engine developed ever increasing power and at war's end these engines were rated at some 1,500 hp. (PT Boaters, Inc.)



Combat

PT boats were to see action in every theater of operations during the Second World War. They were there when the Japanese attacked Pearl Harbor and it is believed that a PT boat was responsible for shooting down the first Japanese aircraft of the war. On the morning of 7 December 1941, six of Squadron 1's boats were tied up at the submarine base. PTs 20 through 25 were alongside and in front of the covered barge that served as a tender for the squadron, the crews of the boats were having breakfast when the attack came.

Two crewmen from PT-23 were sitting on deck when they saw the first Japanese aircraft start their bombing runs. The two of them jumped into the gun turrets of PT-23 and promptly shot down a torpedo bomber which crashed near Kuahua Island. Soon after that, they shot down another torpedo bomber, this one crashing near Halawa, behind the submarine base.

Across from the submarine base, the other six boats of Squadron 1 were being loaded onto the oiler USS RAMAPO. These boats were being transferred to Squadron 3, which was based in the Philippines. PTs 27, 29, 30 and 42 were sitting in cradles on deck and PT-26 and 28 were sitting in cradles on the dock next to the ship. Because the gasoline tanks of the boats were flooded with carbon dioxide to prevent fire during the long trip, the boats could not generate power to operate their turrets.

The two twin .50 caliber machine guns on the boats went into action with a four man crew, one man to fire the guns, two to turn the turrets by hand and an officer to direct the fire. It is unclear whether or not these six boats ever shot down any of the attacking Japanese aircraft, but they did fire more than four thousand rounds of .50 caliber ammunition. The six boats that were being transferred to Squadron 3 were put into the water at Pearl Harbor after it was learned that the Japanese were invading the islands. These boats would conduct anti-submarine patrols in Hawaiian waters during the early days of the war.

Since the six boats from Squadron 1 would not be shipped to the Philippines, Squadron 3 had to start the war with the six boats with which it originally deployed to the islands. The boats of Squadron 3 (PT 31, 32, 33, 34, 35 and 41) were based at the Cavite Navy Yard in Manila Bay. When the Japanese attacked the Philippines on 10 December 1941, at approximately 1245, the boats had enough warning so that they could get underway and have room to maneuver. It was theorized that a PT boat could wait until a dive bomber released its bombs, then by turning the boat hard in either direction, avoid being hit by the bomb. This theory was proven to be true and in the process, PT-31 and 35 claimed three Japanese aircraft shot down. The bombing raid; however, destroyed the Navy Yard and with it, the squadron's spare parts depot and their equipment.

The squadron commander (LT John Bulkeley) had the foresight to place nine spare engines in private garages in the city of Manila. Three of the nine were lost when the Japanese took the city on 2 January 1942. Of the six remaining engines, two were destroyed when the Corregidor North Dock was bombed. The last four engines had to be left on Corregidor when the squadron had to leave in March. What was more serious than the lose of the spare parts and engines was the loss of thousands of drums of one hundred octane gasoline.

Squadron 3 had to be moved to Sisiman Bay, a cove east of Mariveles Harbor on the southern tip of the Bataan Peninsula, but this move was not made until after the boats transported the wounded (from the first attack on 10 December) from the Navy Yard to the hospital at Canacao.

PT-32, underway off the East Coast during late 1940, was one of six early Elco seventy foot PT Boats assigned to Squadron Three under the command of LT John Bulkeley at Cavite Navy Yard, Manila Bay, The Philippines. These boats were in combat from the beginning of the Japanese attack on the Philippines with PT-31 and PT-35 each claiming Japanese aircraft as destroyed. Squadron Three would later become famous for taking GEN MacArthur off the island of Corregidor and safely out of the Philippines. PT-32 was destroyed by friendly fire on 13 March 1942, after she broke down and was found to be unrepairable. (Al Lawrence, Sr.)

PT-369 was one of four seventy foot boats built in Canada and turned over to the U.S. Navy in a sort of reverse Lend-Lease during 1943. The boats had been originally built for the Dutch Navy, but Holland and the Dutch East Indies fell before they could be delivered. (National Archives)

The crew of this eighty foot Elco PT Boat have added to its armament by placing two 20MM cannons on the on the bow and moving the 37MM gun to the extreme bow. (PT Boaters, Inc.)

An eighty foot Elco boat approaches its tender , a converted destroyer-escort. The circular magazine for the 37MM gun is fully loaded, usually boats coming in for servicing would have their weapons empty for safety reasons. (National Archives)

PT-564, was an experimental Higgins PT used to test various items intended for combat boats. From the way the bridge crew is leaning into the wind, the boat is probably moving at near its top speed of forty-one knots.

One by one, the boats were lost in action. The first of the six boats to be lost was the 33 boat. She was lost while she patrolling south of Manila Bay with the destroyer, USS PILLSBURY on Christmas Eve 1941. PT-33 ran hard aground on a coral reef five miles north of Cape Santiago. On Christmas Day, PT-31 and 41 made three futile attempts to tow the 33 boat off of the reef and it was then decided to burn her to prevent her from falling into enemy hands. She was then destroyed on the morning of 26 December 1941.

By this time, the boats were deteriorating quickly due to the unavailability of spare parts, the use of bad gasoline, and the stress placed on the boats by heavy patrol duties as well as emergency trips. The crews were also beginning to show signs of exhaustion and for this reason, the boats were utilized as dispatch boats and also to attack any enemy ships that were found in Manila Bay.

Until the boats were relieved by U.S. Army controlled "Q" boats, they kept patrolling the west coast of Baatan. By this time, the war was not going well for the Allies and it was decided to evacuate GEN MacArthur, his family and staff to Australia. The original plan called for

(Right) With the crew at General Quarters (battle station) PT-557 begins an attack run. The boat is armed with a 37MM and a 20MM cannons on the bow along with late Mk XIII torpedoes and rocket launcher tubes. (Naval Institute).

PT-362 was an Elco eighty foot boat that served with Squadron Eighteen in the Southwest Pacific during the Second World War. (Naval Institute)

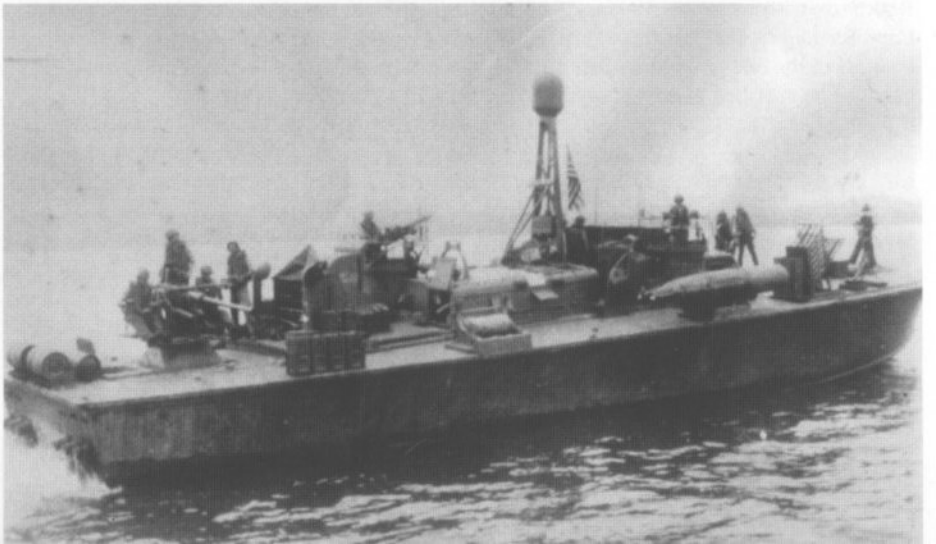
PT-579 was an eighty foot Elco boat named GIZMO by her crew. She was assigned to Squadron Thirty-Nine of the Pacific Fleet.

PT-558 heals over as she begins a turn away from her target. with her guns all manned and ready. She was assigned to Squadron Twenty-nine in the Mediterranean Theater of Operations. (Naval Institute)

the PT boats to deliver the General and his party to a rendezvous with the submarine USS PERMIT. But when enemy warships were detected in the area of the rendezvous, it was then decided that the boats were to take their passengers all the way to Cagayan, where they were to board B-17 Flying Fortresses and be flown to Australia.

It should be noted that, prior to the evacuation, the 31 boat was grounded and had to be

This eighty-foot Elco boat has a "Hedgehog" type rocket launcher on the bow along with a mortar just in front of it. The 40MM gun is trained all the way to starboard. The boat also has a pair of depth charges mounted on the stern.



The crew of this eight foot Elco boat, operating off New Guinea has added an Army mortar to its armament. The boat also has a large White Star and Bar national insignia painted on the bridge as a recognition air for friendly aircraft.

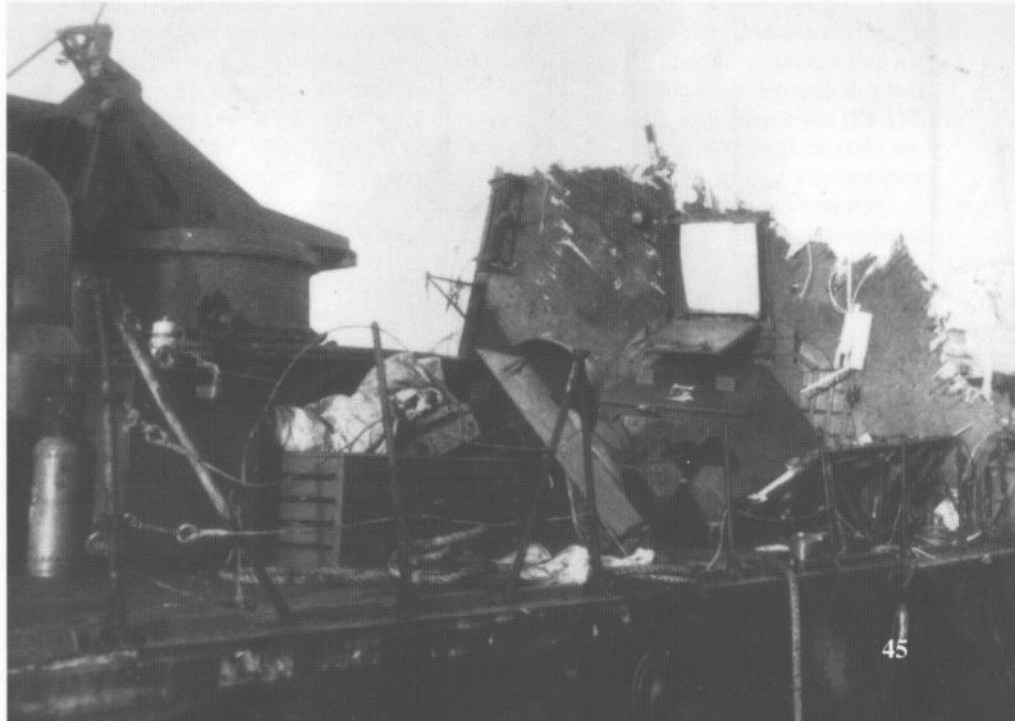
destroyed by her crew to prevent capture. When it came time to evacuate the General, Squadron 3 only had four boats in operation and these four were not in too great of shape, but nonetheless, they held together and did the job that they were tasked with. At the point where the four boats met the USS PERMIT, it was discovered that PT-32 could not go on and it was destroyed by the submarine's guns on 13 March 1942. The next boat to be lost was the 34

A number of PT Boat crews added Army mortars to their armament for both shore bombardment and to fire star, or illumination, shells to light up a target at night. The weapons were easily mounted but were hard to fire accurately from a moving and pitching boat. (D. Jones)

A squadron of Higgins seventy-eight foot boats pull into Miami, Florida for liberty after their shakedown cruise. Shortly after this portcall, Squadron Twenty-two deployed to Europe for operations in the Mediterranean Theater of Operations. (D. Jones).

boat. She met a more worthy end than that of her sisters, she was lost the way a warship should meet its end — in action against the enemy. A Japanese plane strafed her near Cauit Island, Cebu, on 9 April 1942. PT-35 was destroyed to prevent her from being captured on 12 April 1942 as she was evacuating President Quezon from the islands along with PT-41. She struck a submerged object that ripped a hole in the bow and after a gallant effort by her crew,

This PT boat of Squadron Twenty-two was severely damaged in a storm at sea. During the height of the storm, her commanding officer was washed overboard. (D. Jones)



had to be abandoned. PT-41 was the last of the six boats to be lost. Her end came after she had been transferred to the Army to be used as gunboat intended to deter Japanese floatplanes from using Lake Lanao on Mindanao. The Army was in the process of transporting her by truck and trailer when it was discovered that the Japanese had taken up positions on the road to the lake. Since there was no way to get the 41 boat to Lake Lanao, on 15 April 1942, the Army destroyed her.

The eighty foot Elco PT boat's baptism of fire was the Solomons Campaign, where for a short time, it fought beside the now outdated PT-20 class boats.

Squadron 5, the first full complement (twelve boats) sized squadron of eighty foot Elco boats was sent to Panama and was scheduled to be shipped to the Solomons. But the Commander of the Panama Sea Frontier recommended that Squadron 2. a squadron which he felt was a more experienced squadron, be deployed instead and that Squadron 5 remain in Panamanian waters. Six of Squadron 5's boats were transferred to Squadron 2. PT-109 to PT-114, went to the mixed type squadron and were shipped to the Solomons.

The two classes of boats often patrolled together, and more often then not, saw action on those patrols. On the night of 10 January 1943, eight boats, in two groups, were patrolling by Savo Island-Esperance line. Four boats were already out patrolling the area, PT-45 and 39 were in the western sector of the patrol area, while PT-48 and 115 were in the eastern sector.

Another group of boats, made up of PT-112, 43 and 40 set out to cover the Guadalcanal coast between Cape Esperance and Aruligo. Three more seventy seven foot Elcos, PT-59, 46 and 36 were to patrol the area between Tassafarongo and Aoma. They were waiting for a

PT-304, a seventy-eight foot Higgins boat of Squadron Twenty-two was credited with six German targets as destroyed. The radar fitted to this boat was the later SO-A system. (D. Jones)

Squadron Twenty-two was based at Bastia, on the island of Corsica off the coast of southern France. The unit was outfitted with twelve seventy-eight foot Higgins PT Boats (PT-302-313.) They were assigned patrol and anti-shipping operations in the Mediterranean Theater of Operations. (D. Jones)

force of eight Japanese destroyers that were expected to come through the area that night.

PT-43 was the first boat to be able to fire a torpedo at the enemy ships. Her position was given away when a flash from the torpedo tube flared up. This flash was produced either by a faulty impulse charge or by too much grease around the tube. The destroyer took full advan-

This seventy-eight foot Higgins boat was turned over to the Royal Navy as MTB 422. She was based at Leghorn, Italy and saw action in the Mediterranean. (D. Jones)

tage of this unfortunate incident and opened fire on the 43 boat.

The second salvo from the destroyer's guns hit the 43, which caused her to slow down to the point where she was barely making headway. The crew then abandoned ship. PT-40 was the next boat to attack the destroyers, her crew fired all four torpedoes at a target and a single, solid hit was observed. By this time, the enemy ships were firing on all of the boats. A destroyer near Savo opened fire on PT-112, two shots hit the boat, one hit at the waterline amidships and the other smashed into the engine room. The 112 exploded, after all of the crew had managed to get away in the life raft. She settled by the stern and by daylight, she sunk one mile east of Cape Esperance.

1943 was a year of transition for PTs. They were being transformed from anti-shipping platforms into anti-landing craft boats. From July of 1943, what was commonly referred to as "barge busting" became the primary task of the boats. From the start of the barge-busting operations on 21 July 1943 to the end of August, the boats from Rendova claimed to have destroyed eight barges and one auxiliary ship sunk, as well as three barges and one auxiliary ship probably sunk and six barges and one auxiliary ship damaged.

The boats from Lever Harbor, starting their barge-busting operations on 3 August 1943, claimed two barges destroyed, one forced to be beached and eight to sixteen barges damaged. It was discovered that these claims were somewhat conservative because, as the ground forces took previously enemy held territory, it was found that there were far more destroyed barges than were actually claimed.

A seventy-eight foot Higgins boat of Squadron Twenty-two skirts the island of Corsica as she heads back to base at Basita. Operations in the Mediterranean pit U.S. PT Boats against German E Boats and F-Lighters. While Elco boats were the most common PT in the Pacific, the seventy-eight Higgins boats were the most common boat found in the Mediterranean Theater. (D. Jones)

The crew of PT-304, a seventy-eight foot Higgins boat of Squadron Twenty-two, conduct small arms firing training while underway in the Mediterranean. One sailor is firing a Thompson .45 caliber submachine gun, while another has an M1 .30 caliber carbine. The crews of PT Boats carried a variety of personal weapons for situations such as boarding enemy vessels. (D. Jones)

The use of the boats in this new role was having the desired effect on the enemy. It appeared that the boats had a strangle hold on the enemy's supply lines, in a message that was captured after a 23 July 1943, PT boat attack on three barges, the Japanese reported that they thought that about twelve PT boats made the attack when in fact, only three boats (PT-117, 154 and 155) made the attack and sank one of the barges. The PT boats chased the other two back in the direction of their base. If these barges had such an important mission that just three PT boats were able to stop it, it meant that the boats were performing well in this new role.

Because of the successes that the boats were having against the barges, the Japanese began to put armor on the barges and to give them more firepower. On the night of 26/27 July 1943, three boats (PT-106, 117 and 154) attacked six large barges that were so well protected by armor that the machine guns and the 20mm cannon on the PTs had no effect on them. It was decided then that the boats were going to need more firepower. The squadrons in the field tested different armament variations, and it was decided that 40MM and 37MM guns were the most effective and best suited weapons for the task at hand. There was even a program instituted where three of the now out-of-date Elco seventy-seven foot boats had all of their torpedoes removed, additional armor installed on the superstructure and, where the torpedoes had been installed, had either single or twin machine guns mounts, a single 40MM Bofors cannon was installed the bow and on the stern and radar was also installed. The idea worked, but it was found that the hulls of the older seventy-seven foot Elco boats were too old to take the stress of the added weight.

Although the 37MM was not a heavy hitting gun like the 40MM, it was still a good weapon to destroy a barge. As it was stated in an after action report of a 29/30 August 1943, barge-busting mission in which a heavily loaded barge was encountered off of Vella Lavella, "the barge probably would not have been sunk, except for the very effective fire of the aircraft type automatic 37MM guns."

The war in the Pacific was a "barge-busting" war and was basically ruled by the two Elco classes. While the Higgins PT-71 class boat seemed to have a secondary role in that theater, it was the predominate class of boat in the Aleutian campaign. Its real showcase; however, was the Mediterranean Theater of Operations (MTO). Where the Pacific based boats encountered mostly landing barges and an occasional warship, the Higgins PT boats encountered almost every type of vessel the enemy could throw at them.

When the allies took Palermo on 23 July 1943, the PT boats encountered an Italian fishing craft that was trying to escape with the staff of the Italian Admiral at Trapani. His staff was also smuggling money out as well. Near this fishing boat, the PT boat crew saw a life raft with seven German soldiers paddling out to sea in an attempt to escape. The PT boats picked up these men as well. From Palermo, the boats patrolled the Strait of Messina, the narrow channel that separates Sicily from the Italian mainland. One night, PT-209, 216 and 204 were patrolling off of the coast near Palmi when the three boats came across a tug towing the Italian merchant ship VIMINALE. PT-216 scored a torpedo hit on the VIMINALE and while shore batteries were taking the boats under fire, they strafed the tug until it was smoking and stopped. As they were leaving the area, the crews saw the VIMINALE going down by the stern and later, the tug also went under.

Two nights later, three boats, PT-202, 210 and the 214 tangled with what the Germans called F-lighters for the first time. From then on out, the F-lighters were to become the PT boat's principle target in the Mediterranean. The F-lighters were one hundred seventy feet long with a cargo carrying capacity of approximately one hundred twenty tons. It was almost impossible for a PT boat to sink an F-lighter because of its well compartmented hulls with anything less than a torpedo.

The F-lighters were heavily armed, with 76MM, 88MM, 20MM guns as well as various calibers of machine guns and they were not as vulnerable to gunfire as Japanese landing barges. PT boats also saw action against their Italian counterparts. The Italians called their torpedo boats MAS boats, these boats were sixty feet long and were lightly armed with two torpedo tubes and light machine guns. They had a top speed of about forty-two knots, and most of the time, could very easily outrun the American PT boats. On the night of 28/29 July 1943, PT-218, 214 and 203 tried to make a torpedo attack on three MAS boats, but their torpedoes, although well aimed, ran under the enemy boats. The American PT boats then decided to strafe some F-lighters, a battle which ended in confusion and left PT-218 severely damaged.

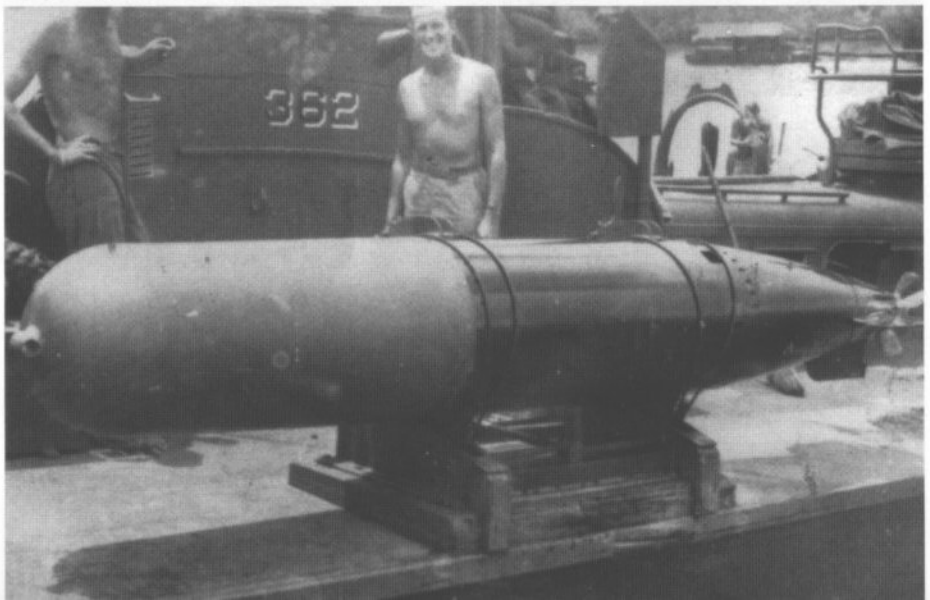
The Pacific war was a barge-busting war, while the war in the Mediterranean was a torpedo war. In the Mediterranean, the PT boat's torpedoes were its primary weapons system. The torpedo did not, however, corner the market, and other weapons were tested and used there as well. One such weapon was the five inch spin stabilized rocket. These rockets could be used to destroy a target such as a F-lighter or even an E-boat (one hundred ten foot German version of the PT boat). Instead of being constructed out of plywood and Mahogany, these fast attack craft were made of metal, they were also heavier armed than their American and British counterparts. E Boats had a shallow enough draft that a torpedo, in most cases, passed under them and the guns on the early American boats did not have enough firepower to damage an E-boat in a gun battle. So the rockets showed a great deal of promise in that role. A drawback of the rockets was that a blaze of flame from their ignition revealed the boat's position, another flaw was that they were not very accurate and because of these two facts, they were only used twice in the Mediterranean.

PT-211, 203 and 202 were patrolling between Giglio Island and the Argentario Peninsula when they encountered what they thought to be either a F-lighter or an E-boat on radar. As the three boats closed the range, the target moved toward the island in an attempt to evade the three boats. The boats did not have a chance to fire their rockets because of inclement weather. On the night of 29/30 June 1943 PT-308 and 309 were on a patrol between Cape Falcone on the Italian coast and the northwest tip of Elba Island. They acquired a blip on radar from inside the harbor of Portoferraia on Elba. This radar target turned-out to be two Italian MAS boats, the two PT boats closed the range and engaged the enemy boats. The two MAS boats sped away to the North, firing back at the PT boats with their 20MM guns. PT-309 gave chase for ten miles up the coast and had a running gun battle with them until it appeared that one of the MAS boats was taking multiple hits. It slowed down and finally coming to a stop. As the Italian boat was slowing down, the two American boats closed the range and started to concentrate their fire on the stricken boat. As the two boats drew closer, the crews could see that the crew of the MAS-562 had escaped in a life raft, they were taken prisoner by the Americans, the Americans captured fourteen crew members in addition to the commander of the MAS flotilla based at La Spezia.

There was only a small fire on board the MAS-562 which caused minor damage to the boat. The crew of PT-306 went out to the 562, put the fire out and towed the captured boat back to Bastia. It is believed that the two MAS boats were in Portoferraia to evacuate some high-ranking German officers who were able to hide long enough so not be taken prisoner by Allied forces.

In the Atlantic, the boats of the smallest Squadron in Naval service (the second Squadron 2) were assigned as dispatch boats. PT-71 was with the USS AUGUSTA, PT-72 accompanied

PT 362 was an eighty foot Elco boat assigned to Squadron Eighteen in the Southwest Pacific. She was retrofitted with the Mk XIII torpedo and light weight racks. The boat's number was painted on the pilot house in Black, highlighted in White. (National Archives.)



Some PTs saw no action with the U.S. Navy. This seventy-eight foot Higgins boat was built in 1945 and saw limited service with Squadron Forty-three, mainly in the training role, before being transferred to the Soviet Union for duty with the Soviet Navy. She carried standard late war PT armament of a 37MM cannon on the bow, a pair of rocket launchers, twin .50 caliber machine gun turrets, a 20MM cannon amidships, Mk XIII torpedoes on light weight racks and a 40MM Bofors on the stern. (PT Boaters, Inc.)

the USS ANCON and the PT-199 teamed up with the USS BAYFIELD, the flagship of ADM Moon. On D-Day (6 June 1944), the 199 took an army officer from the BAYFIELD to Utah Beach and then rescued sixty-one survivors of the destroyer USS CORRY, which had hit a mine.

On D-day the PT boats were assigned to the "Mason Line" to guard against E-boat attacks on the invasion forces. The Germans made so few attempts to slip through the PT screen that it seemed that their duty was dull. On the evening of 7 June 1944, PT-505 gave chase to what the crew thought was a U-Boat periscope, which disappeared as the 505 drew close. The boat was seventy-five yards away and was preparing to drop her depth charges, when she hit a mine. Two men were injured, one depth charge broke loose, the warheads were blown off the torpedoes and the engines were shifted off their mounts. The boat sank by the stern until the base of the 40MM gun was under water, the crew then jettisoned the torpedoes, the other depth charge and transferred their radar and radio equipment to PT-507. PT-507 towed the 505 to St. Marcouf Island, where the next morning, two landing craft towed the 505 onto the beach. When the tide went out, the 505 was left high and dry for six hours, which allowed the crew time to patch the hull. On 11 June 1944, the 500 towed the 507 back to Portland, England, although the trip was made even longer by the fact that the towing lines broke four times.

The boats based in England did more than just cover the D-Day landings, in fact, the three boats of Squadron 2 (2) (the second squadron that was commissioned with that number) were used on secret missions by the OSS (the forerunner of the CIA). PT-308 and three other boats arrived in England on 24 April 1944 and were fitted out with special navigation equipment so they could pinpoint their positions. Officers and enlisted men of the squadron learned how to launch, load, recover and unload special rowing boats equipped with padded sides so that they could put an OSS agent and his equipment on an enemy held beach, even on a moonless night, without a sound. It should be noted that the squadron successfully conducted all of its nineteen missions for the OSS without even making contact with the enemy.

The final theater of operations of the war for the PT boats was the return to the Philippines in 1944. On the night of 24/25 October 1944, the Battle of Suriagao Strait took place and PTs were there, thirty-nine strong. The boats took up position along the coasts of Mindanao, Leyte and Bohol far into the Mindanao Sea. Their job was to act as a scouting force for ADM Oldendorf's task force of battleships, cruisers and destroyers. Detection of the enemy force was the primary task of the thirty-nine boats, their secondary responsibility was to attack the enemy.

The PT boats saw a lot of action in the Battle of Surigao Strait and thirty of the thirty-nine boats were under fire from the gunners on the Japanese ships. Ten of these were hit, the 493 boat was lost after being hit by three 4.7 inch shells and PT casualties from the battle stood at three men dead and three officers and seventeen men wounded. Thirty-five torpedoes were fired from fifteen boats and of these thirty-five torpedoes, fourteen were complete misses, one ran erratically, one had a "hot run" on deck, eleven were unobserved and seven were claimed as possible hits. There is no doubt that PT-137 torpedoed and put the IJN ADUZUKA and IASAGAMQ out of action. GEN Douglas MacArthur left the fortress at Corregidor on 11 March 1942 aboard PT-41 and two years, eleven months and nine days later, he returned there on 2 March 1945, aboard PT 373.

The last PT s lost in the Second World War were not at the hands of the enemy instead, they were destroyed by friendly fire. PT-77 and PT-79 were patrolling near Talin Point, the Philippines when American destroyers mistook them for the enemy and took them under fire on 1 February 1945.

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PT-41 was commanded by LT John D. Bulkley, squadron commander of Torpedo Squadron Three in the Philippines at the start of the Second World War. He and his crews were later made famous by the book and movie "They Were Expendable".

PT-66, a seventy-seven foot Elco Patrol Torpedo (PT) boat, was camou[illegible] for operation[illegible] off New Guinea during early 1943. She was assigned to Torpedo Squadron Eight.

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